AY 10 1946
echnology

ROADS AND STREETS

DECEMBER 1945

Get that Rock out of your way with TIMKEN ROCK BITS

It's Quicker . . . Better . . . Cheaper

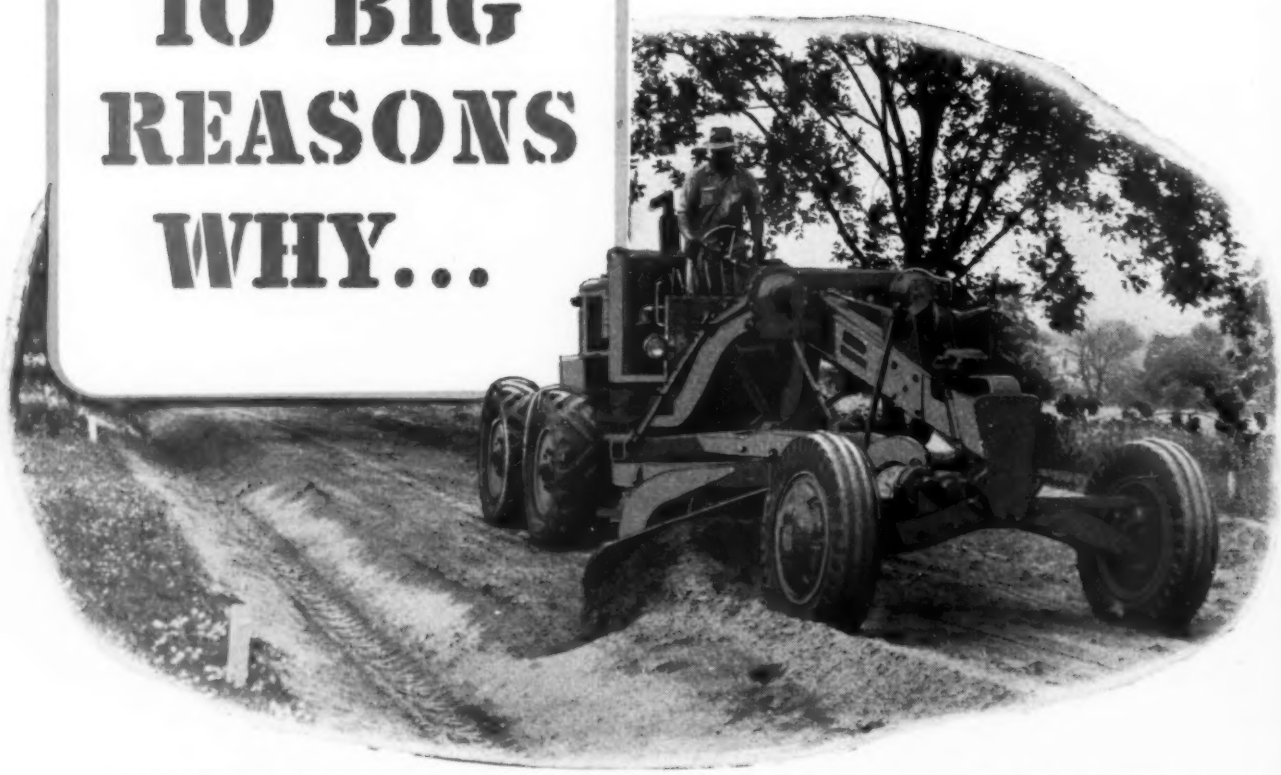
The more rock you have to drill, the more you will appreciate the advantages of Timken Removable Bits.

This modern rock drilling tool is used by many contractors, who have discovered in it the answers to their rock-removal problems.

The scientific design of the Timken Bit; its time-tested shoulder construction; and the Timken Steel of which it is made combine to make it drill faster, drill farther, last longer.

Holes cost less when they're drilled with Timken Bits—as any user can testify, be he contractor or mine operator. You can't afford to pass up these savings. Write for name of nearest Authorized Distributor. The Timken Roller Bearing Company, Canton 6, Ohio.

10 BIG REASONS WHY...



OWNERS PREFER ADAMS MOTOR GRADERS

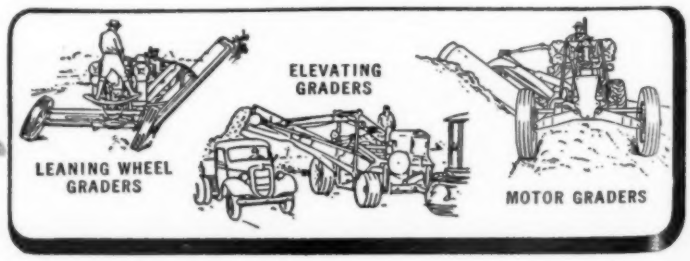
★ There are many reasons why Adams Motor Graders are the outstanding choice of owners who demand the utmost in performance, utility, endurance and economy. Here are ten of the foremost:

1. **STRENGTH AND DURABILITY**—Adams have the rugged strength and stamina to stand up under continuous hard work—with minimum maintenance and repair.
2. **BALANCED DESIGN**—Weight is distributed to exert adequate blade and scarifier pressures, utilizing full power and traction of Adams machines.
3. **POWER AND TRACTION**—All models powered by dependable International engines, with lugging ability to hang on in tough going. Suitable traction utilizes full engine power.
4. **ADAPTABILITY TO WIDE RANGE OF JOBS**—All models, from smallest to largest, are adaptable to every type of surface, ditch and bank work of which motor graders are capable.
5. **WIDE RANGE OF SPEEDS**—All models have wide range of working speeds, plus high top speeds for fast transport from job to job.
6. **EASY STARTING**—Push-button starting available—engine starts easily, in any weather.
7. **DEPENDABLE OPERATING CONTROLS**—Adams positive mechanical controls always operate at uniform speed, regardless of number used at any one time.
8. **ECONOMICAL OPERATION**—International engines are easy on fuel and oil—economical to keep up. All working parts of graders are adjustable for wear, insuring long life.
9. **BIG FRONT AXLE CLEARANCE**—Adams high-arch front axle provides exceptional clearance—no power wasted bulldozing axle through heavy windrows.
10. **WORLD WIDE DEALER SERVICE**—Adams machines are sold and serviced throughout the United States and Canada, and in 30 countries all over the world.

The proof of Adams superiority is in the performance facts. Ask your near-by Adams dealer for the full, convincing story.

J. D. ADAMS MANUFACTURING CO.
Indianapolis, Indiana

Adams
ROAD-BUILDING AND EARTH-MOVING EQUIPMENT



BAR MATS that speed the job

As the big pavers and the squat finishing machines move along, the work goes smoothly and quickly if you're using Bethlehem Bar Mats. For they're rigid, easy to handle, and lie flat once they're in place.

In the stockpile and alongside the road, they'll stand a lot of rough treatment. No time wasted straightening out your bar mats—because these Bethlehem mats, made of new-billet steel bars clipped together, really *can* take it!

Bethlehem can supply not only bar mats but all the other steel products used in concrete highways and highway bridges. Buy the Bethlehem way, and you get coordinated service that will save you confusion, delay and extra paper work. Your order is handled as a unit, with shipments scheduled to reach the job as needed.

Write or phone the nearest Bethlehem district office today for full information about Bethlehem road steel service.

BETHLEHEM HINGED BAR MATS

For convenient handling and stockpiling in wide widths, Bethlehem has developed a new hinged reinforcing-bar mat which folds over double. Made like the regular bar mat, of deformed bars clipped together, it is easier to truck, and can be handled by two men. It is less likely to be damaged in handling, is readily installed, and lies flat.

BETHLEHEM PRODUCTS FOR HIGHWAYS

Road Joints • Center Strip • Dowels • Dowel Bar Supports • Reinforcing Bars Bar Mats • Bar Ties • Reinforcing for Concrete Pipe • Bridge Floor Reinforcing Concrete Slab Spacers • Welded Wire Fabric • Guard Rails • Guard Posts and Brackets • Wire Rope and Strand • Right-of-Way Fence and Posts • Anchor Rods • Pipe • Hollow Drill Steel • Digging Bars • Structural Steel • Mold Boards • Corrugated Sheets • Turnbuckles • Tie Rods, Spikes, Bolts and Nuts Timber Bridge Hardware • Sheet and H-Bearing Piling

★ BETHLEHEM STEEL ★

Ready
to assist you
on roadbuilding
problems

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INSTITUTE

MEMBER
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Hill Brick Co.
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Metropolitan Paving Brick Co.
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Stone Creek Brick Co.
Stone Creek, Ohio

Do you want technical and engineering data on new practices in the design and construction of roads and streets? Do you want more information about *brick*—most permanent and satisfactory roadbuilding material?

Get in touch with the Paving Brick Institute—newly formed, and affiliated with the internationally known Structural Clay Products Institute.

All of the member companies of the Institute, listed on the left, are ready to serve and assist you.

•

PAVING BRICK INSTITUTE

1756 K Street N. W., Washington 6, D. C.

•

ROADS AND STREETS

Vol. 88 DECEMBER, 1945 No. 12

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A magazine devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations, and to the construction and maintenance of airports.

WITH ROADS AND STREETS HAVE BEEN COMBINED GOOD ROADS MAGAZINE AND ENGINEERING & CONTRACTING

HALBERT P. GILLETTE, President; EDWARD S. GILLETTE, Publisher; HAROLD J. McKEEVER, Editor; CHARLES T. MURRAY, Managing Editor; JOHN C. BLACK, Field Editor; LT. COL. V. J. BROWN, Publishing Director (Absent on Military Duty); H. J. CONWAY, Advertising Editor; L. R. VICKERS, Promotional Director.

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First WITH HYDRAULIC DRIVE

Joseph Kesl, Rental Equipment Co., Missouri—Used a hydraulic drive Lorain 82 in gumbo and sand constantly for 4 years, says, "We have operated 7 makes of draglines and my honest opinion is that Lorain tops them all!"

La Clede Christy Brick Co., Missouri—At last report a year ago had piled up 8,000 hours in 2 years on a hydraulic drive L 82—4 years' work in 2—and still going as strong as ever.

Liberty Limestone, Virginia—Four years, 9 hours a day, 26 days a month—rock all the way—reports, "Simple, durable and satisfactory!" Has purchased a second L 82 to prove it!

LOOK AT THIS RECORD...

Contractors Service Corp., Pennsylvania—handled 3,000,000 tons of rock a year with 5 Lorain 82's—50,000 tons a month per shovel for 12 months straight!

...AND STILL FIRST AFTER 5 YEARS!

There's no substitute for experience! And today when hydraulic drive is just coming into its own in construction equipment, Thew—who pioneered it in the shovel and crane field—can offer you tested hydraulic coupling equipped machines with 5 years of tough concentrated field work behind them!

Here—in the 2-yard Lorain 82—is hydraulic drive at its peak. You can't shock this shovel. Slam the dipper into the pile or tie into the biggest rock and the Lorain-engineered hydraulic coupling absorbs shocks and strains—reduces maintenance by lengthening machinery life. Not only that! The power hangs on like a bulldog till the rock is in the dipper—the engine never stalls.

Hydraulic drive plus Thew Center-Drive direct-to-the-point turntable power application; two speed chain drive crawler; all-steel, all-welded boom; all-steel dipper stick and new, one-piece, streamlined dipper make the "82" ideal for rock and other tough work.

Hydraulic drive can save you plenty! Be sure you get it at its *tested* best—in a proven Lorain 82. Ask your Lorain distributor for details today.

HYDRAULIC DRIVE STANDARD ON ALL LORAIN 82's AT NO EXTRA COST

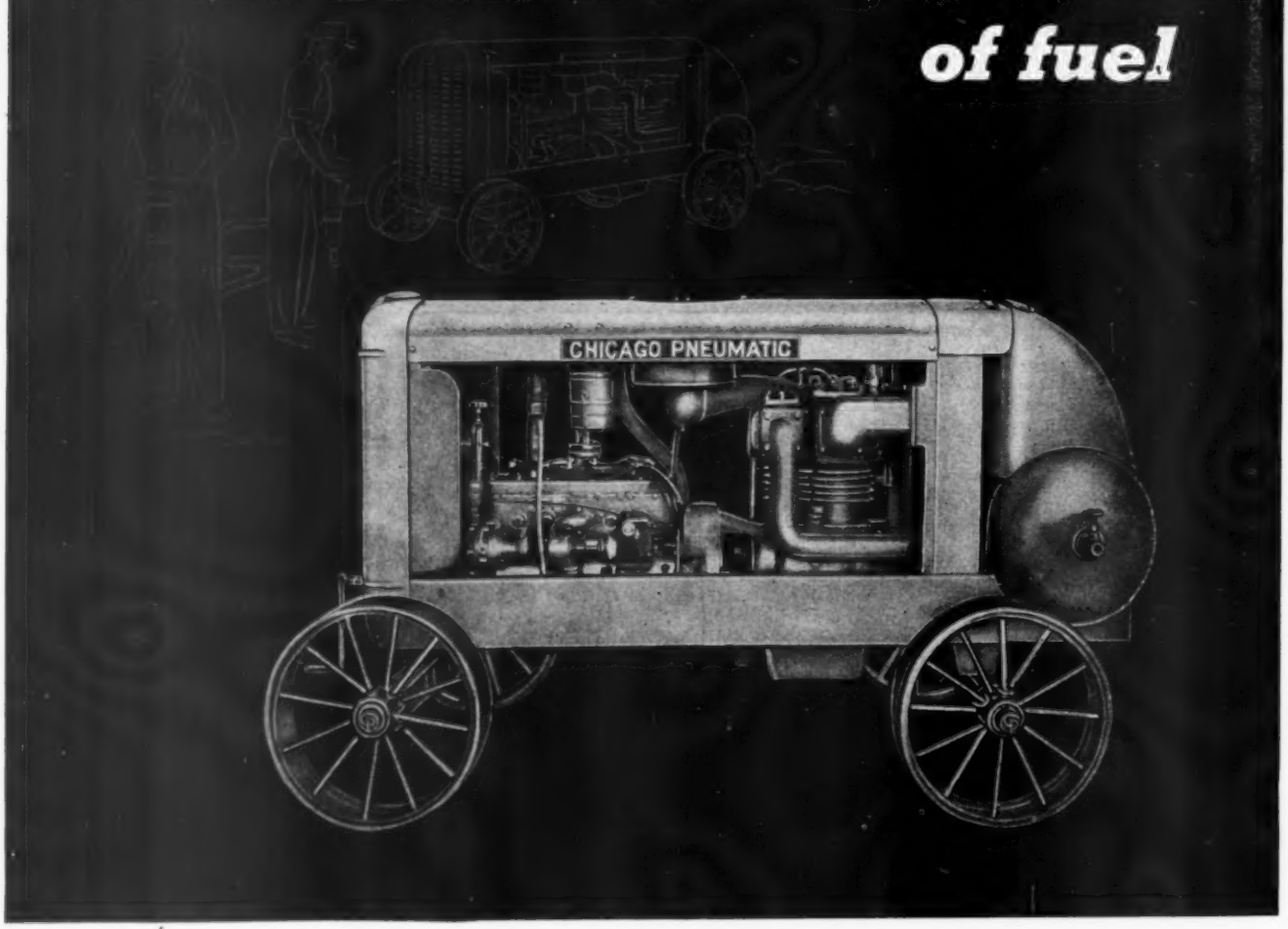
Reg. Trade Mark

thew-Lorain

THE THEW SHOVEL CO.
LORAIN, OHIO

CRANES • SHOVELS • DRAGLINES • MOTO-CRANES

15% to 35% more air per gallon of fuel



CP PORTABLE COMPRESSORS

AN outstanding feature of CP Portable Compressors is the gradual speed regulator. Synchronizing engine speed with air demand, it varies the speed—not by steps but gradually — up and down, exactly as air demand varies. The result is a marked economy of fuel and a reduction in wear. CP's complete line of gasoline and Diesel powered compressors offers greater portability due to lighter, more compact construction. For full information write for Bulletin 758-2.

Chicago Pneumatic Portable Compressors are available in gasoline powered models of 60, 105, 160, 210 and 315 c.f.m.; and in Diesel powered sizes of 105, 160, 210, 315 and 500 c.f.m.; with steel wheels, pneumatic-tired wheels or skid mountings.

★★★★★★★★
PNEUMATIC TOOLS
ELECTRIC TOOLS
HYDRAULIC TOOLS
ROCK DRILLS

CHICAGO PNEUMATIC
TOOL COMPANY
General Offices: 8 East 44th Street, New York 17, N. Y.

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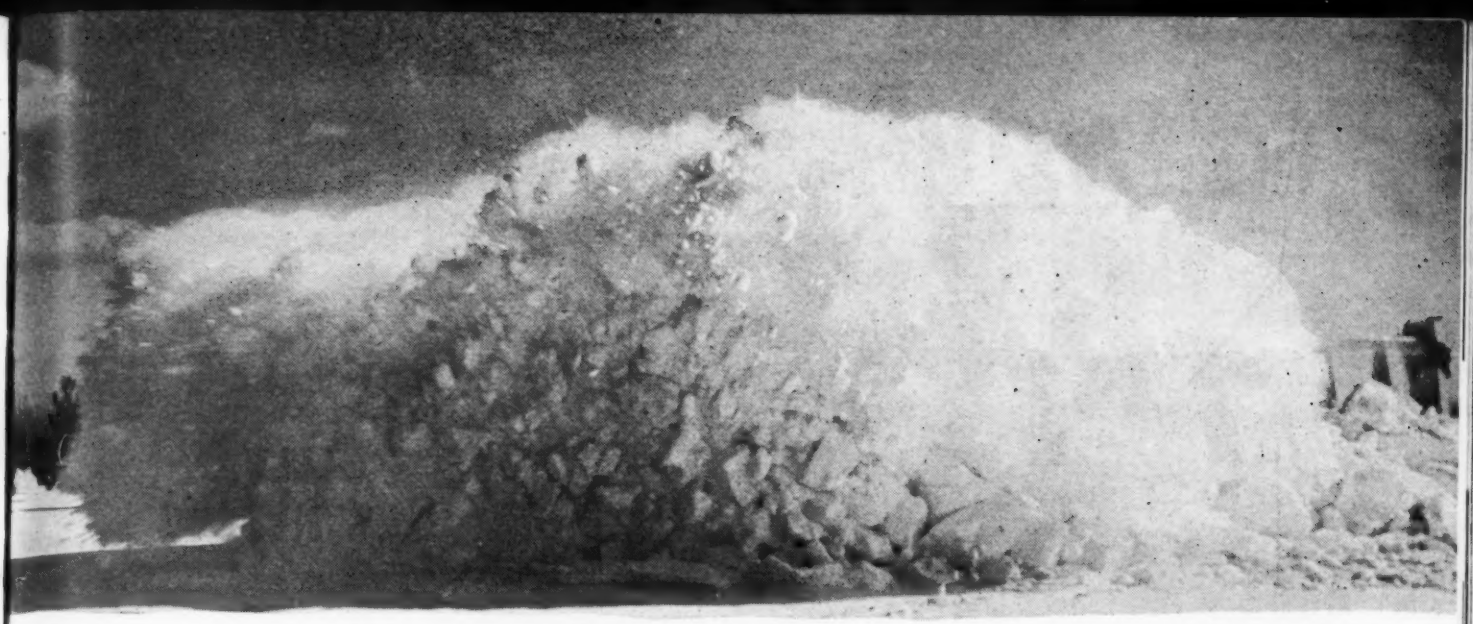
AIR COMPRESSORS
VACUUM PUMPS
DIESEL ENGINES
AVIATION ACCESSORIES



FWD *Snow-Bank Busting* POWER
CONQUERS HEAVIEST DRIFTS

● FWDs are the snow-clearing trucks that can bust in and break the worst snow banks — clean them up fast, economically! Sure-footed traction and power on all four wheels make FWDs the No. 1 snow removal and road maintainance trucks of the nation. Thousands of these rugged, heavy-duty trucks, equipped with many different types of snow plows, will deliver the knockout punch to snow in every state in the snowbelt this year, and remove the menace of snowbound highways, streets, airports and other areas where snow must be put out of the way.

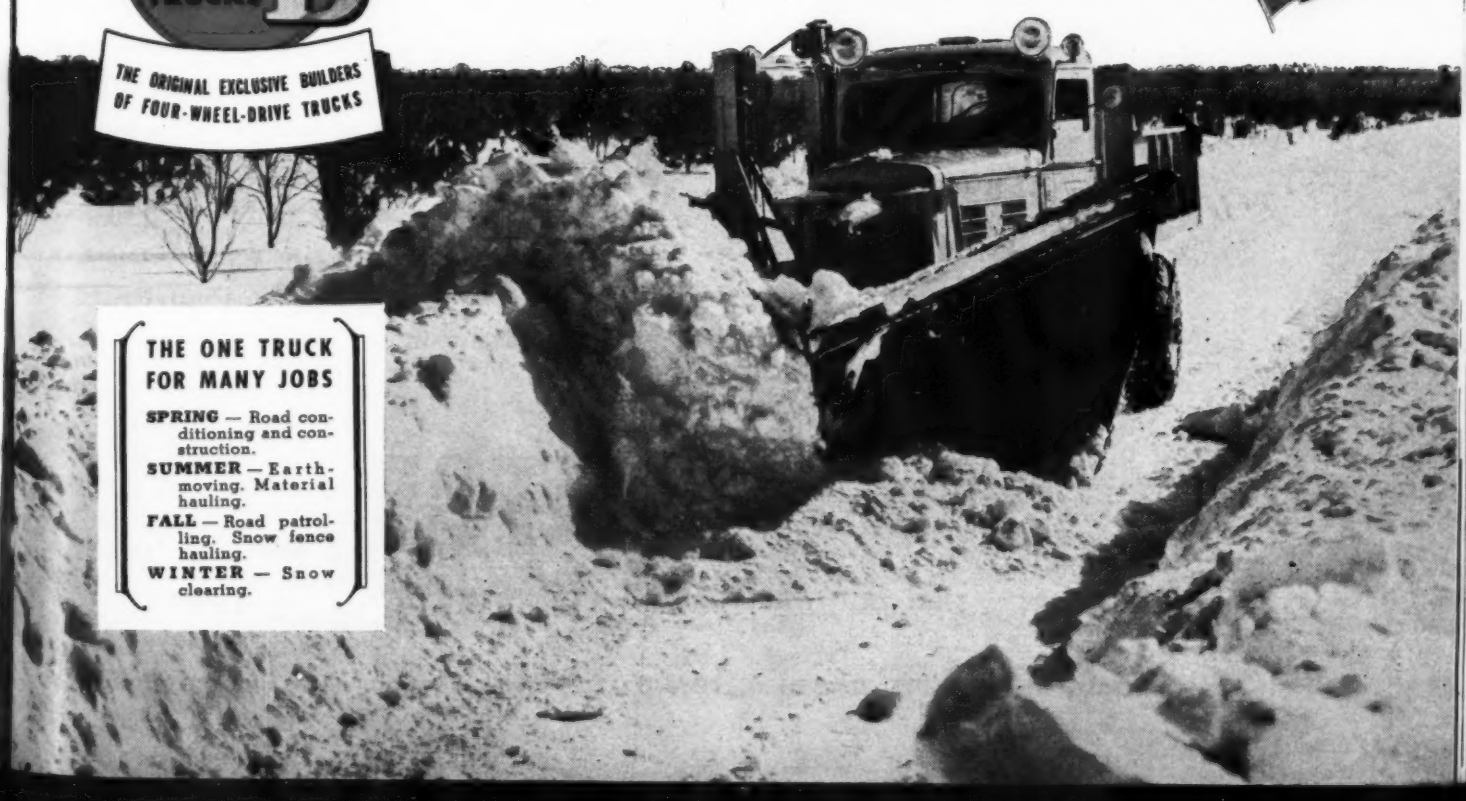
When Spring comes, these same rugged snow-fighting trucks will have their plows removed, to change over to the many other tough road jobs which only four-wheel-drive power and traction can match. One truck for ALL jobs, ALL seasons . . . that's the FWD!

THE FOUR WHEEL DRIVE AUTO COMPANY, Clintonville, Wis.

Canadian Factory: KITCHENER, ONTARIO

FWD TRUCKS

THE ORIGINAL EXCLUSIVE BUILDERS OF FOUR-WHEEL-DRIVE TRUCKS

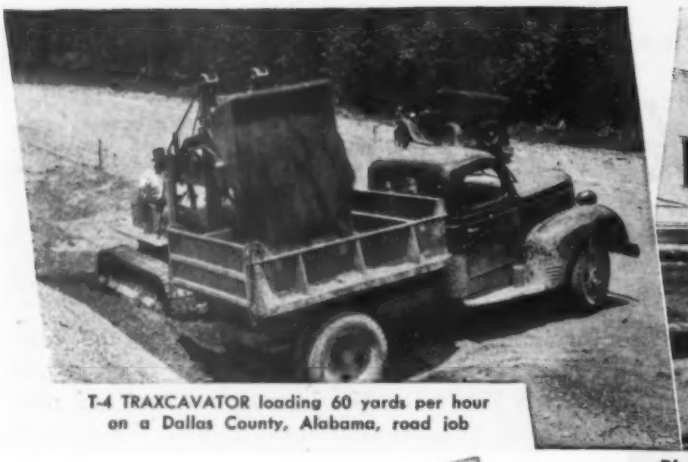


THE ONE TRUCK FOR MANY JOBS

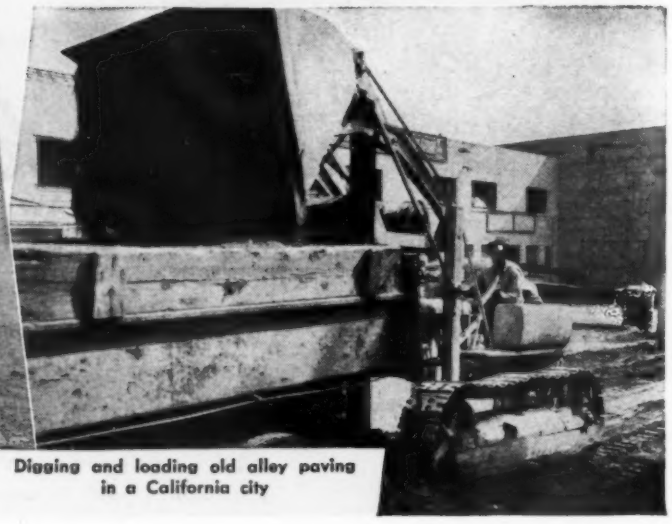
SPRING — Road conditioning and construction.
SUMMER — Earth-moving. Material hauling.
FALL — Road patrolling. Snow fence hauling.
WINTER — Snow clearing.

Plan NOW to TRAXCAVATE!

IT'S THE MODERN DIRT AND MATERIAL HANDLING METHOD



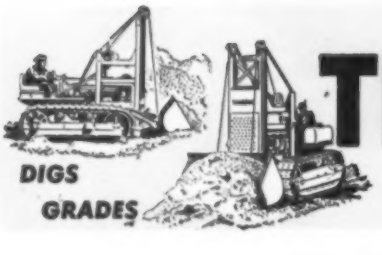
T-4 TRAXCAVATOR loading 60 yards per hour on a Dallas County, Alabama, road job



Digging and loading old alley paving in a California city

Fine grading between forms ahead of paving machine for a midwest highway

Now that the "go-ahead" signal has been given, your well-planned construction and maintenance projects will get off to a flying start if you have planned to "TRAXCAVATE" — for it's the modern earth-moving and material-handling method. TRAXCAVATORS, the dependable tractor excavators, combine in one machine the usefulness of a Shovel, Loader, Scraper, Bulldozer, Anglegrader, etc. There's a wide choice of models with bucket sizes from ½ to 2½ cubic yards. Your nearby TRACKSON-"Caterpillar" dealer will be glad to give you the complete story, or write for informative literature to TRACKSON COMPANY, Dept. RS-125, Milwaukee 1, Wisconsin.



DIGS
GRADES

TRAXCAVATOR

REG. U. S. PAT. OFF.

THE ORIGINAL TRACTOR EXCAVATOR

LOADS
CARRIES

STILL YOUNG

At-45,000 hours

As the hour-meters on "Caterpillar" Diesel Engines, Tractors and Motor Graders roll up work records of 20, 40 and even 50 thousand hours, the evidence of sound planning, correct engineering and quality manufacturing grows more and more impressive.

What were once considered unusual life spans in power equipment are rated today as "normal expectancies" in "Caterpillar" Diesels. It is when "outside" comparisons are made that their outstanding endurance and performances are fully appreciated.

Typical examples of the long, serviceable life of "Caterpillar" Diesels are pictured here. At the time their hour records were reported, the units were still "going strong" and, according to their operators, far from the end of their career.

CATERPILLAR TRACTOR CO.
Peoria, Illinois

45,000 WORKING HOURS is the record of this old "Caterpillar" Diesel Forty Tractor. Owners: Baragar Bros., Contractors, Elm Creek, Manitoba. Used with bulldozer, scraper, blade and elevating graders—on road building and airport contracts, winter freighting, and general farm work. Owner says, "Does twice as much work—and at half the operating cost—as the tractor it replaced."

At-19,200 hours

19,200 WORKING HOURS is the record of this husky "Caterpillar" Diesel No. 11 Motor Grader. Owner: Pratt County, Kansas (R. A. Peterson, County Engineer). Used for grading, snow-plowing and general road maintenance. Mr. Peterson says, "Operates at 60% of fuel cost and does twice as much work as the equipment it replaced."

22,000 WORKING HOURS is the record of a Diesel Seventy-Five Tractor this progressive county owns.

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

The discharged veteran wears this emblem. Remember his service and honor him.

BUILT to

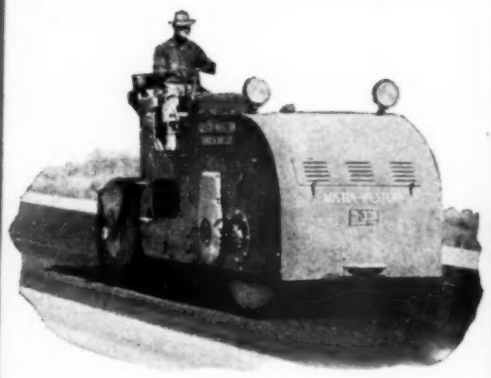
As America's Post-war Highway Program Gets Under Way

► Exclusive features that save time and money by getting the job done better and quicker. "Plus values" built into every Austin-Western machine . . . values accumulated by engineering experience that has lived close to road building and earth moving problems and practices since the first crude Austin-Western tools of 1859.

Features of design and construction "job tested" before the war . . . that met the acid test of service on far-flung war fronts.

More than ever your post-war Austin-Western machine is "Built to Outperform".

AUSTIN WESTERN COMPANY
AURORA, ILLINOIS, U. S. A.

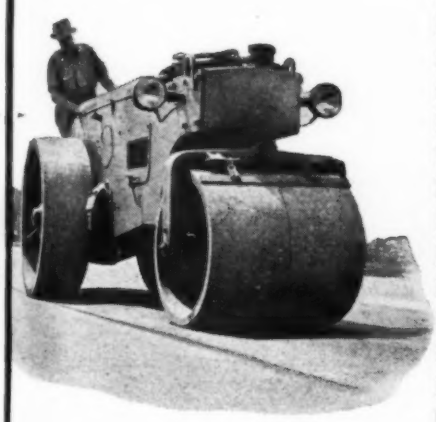


TANDEM ROLLERS—Made in 2 sizes—5 to 8-Ton and 8 to 10½-Ton. The variable weight feature enables one machine to handle a wide variety of jobs.

CRUSHING EQUIPMENT—Roller bearing jaw crushers and roll crushers in a wide variety of sizes. Portable and semi-portable crushing and screening plants for all purposes.

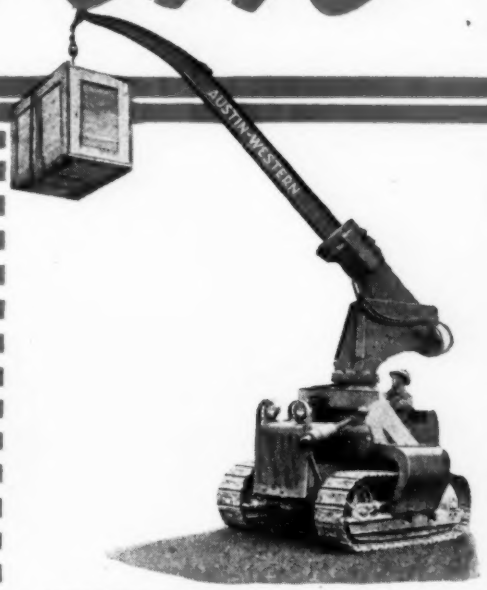
MOTOR GRADERS—The "99-M" and "88-M" Power Graders with their exclusive All-Wheel Drive and All-Wheel Steer, and wide assortment of attachments, are famous for their ability completely to outperform ordinary motor graders. The No. 55 is a smaller model for maintenance and light grading.

Outperform



WHEELED ROLLERS—Made in sizes ranging from o 12 tons. Gasoline or diesel engines. Hydraulic power steer. Hydraulic scarifier attachment.

PATROL SWEEPER—Compact, simplified, quick-dumping. Rear broom throws dirt directly into hopper. May be had with Leaf Broom attachment.



HYDRAULIC CRANE—Retractable-extensible boom provides ability to lift and carry maximum load under such handicaps as low doors and ceilings, inside box cars, etc.

DGER SHOVEL—Convertible to crane, dragline, ndriver, trench hoe, and skimmer. ¾-swing design has many operating advantages.

TRAIL CARS—Hopper-bottom and side-dump types. Designed for heavy duty haulage behind powerful truck-tractors, in open pit mines, quarries, etc.

DUMP CARS—Side dump models built in capacities up to 50 yds. (level full), and 90 Tons; in standard, narrow and foreign track gauges. Also hopper type, bottom-dump Cars.

BUILDERS OF ROAD MACHINERY

Austin-Western

SINCE 1859

BUY MORE WAR BONDS

Steam Hot Water or Heat ..

-- at Low Cost for every yard need

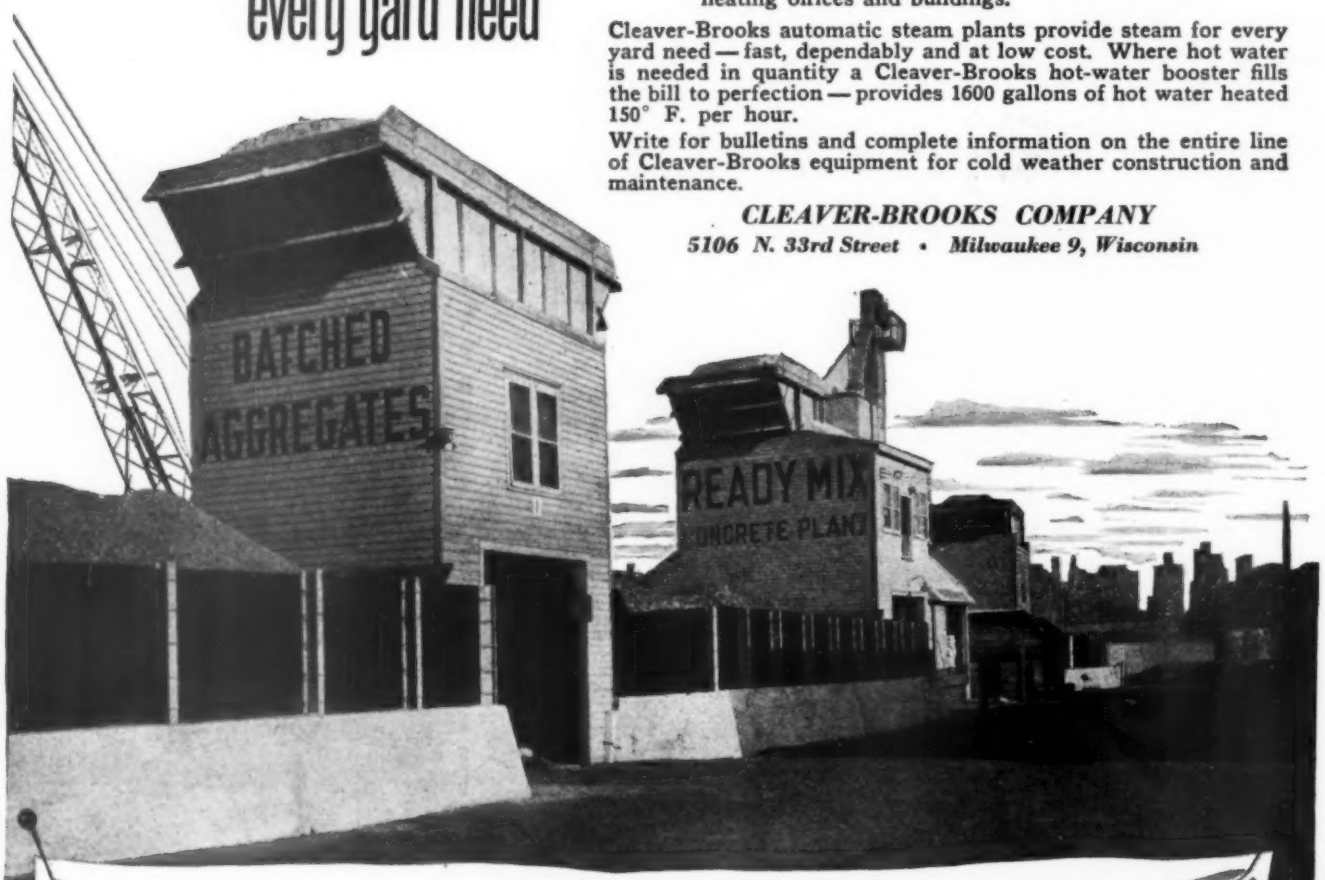
● Profitable, uninterrupted yard operation in cold weather calls for steam — hot water or heat — for many purposes.

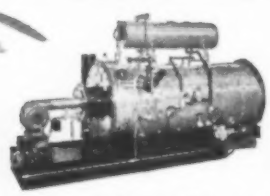
- thawing and heating aggregate in stock piles or bins — for winter concreting.
- heating water for central mixing plants.
- heating asphalt, oils, bituminous material in tank cars or storage tanks.
- steam or hot water for cleaning machinery — heating offices and buildings.

Cleaver-Brooks automatic steam plants provide steam for every yard need — fast, dependably and at low cost. Where hot water is needed in quantity a Cleaver-Brooks hot-water booster fills the bill to perfection — provides 1600 gallons of hot water heated 150° F. per hour.

Write for bulletins and complete information on the entire line of Cleaver-Brooks equipment for cold weather construction and maintenance.

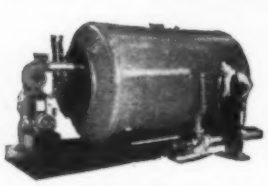
CLEAVER-BROOKS COMPANY
5106 N. 33rd Street • Milwaukee 9, Wisconsin





Automatic Steam Plants

Completely self contained; highly efficient; require only simple piping connections to place in operation. Fully automatic fuel-oil burner; condensate recovery and feed water pumping system; no stack needed, sizes from 20 to 500 h.p.; pressures 15 to 200 lbs.

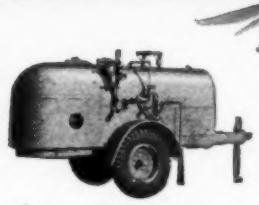


Hot Water Boosters

Oil-fired; fully automatic or manual operation; no licensed engineer needed; two capacity sizes: 3000 gals. storage tank for 1600 gals. of water heated 150° F. per hour; 1500 gals. storage tank for 800 gals. of water heated 150° F. per hour.

Portable Pumping Boosters

Heats bituminous material by direct firing in one operation, loading directly to distributor, relay truck or returning to tank car. Two sizes, truck mounting or 4-wheel trailer.



Portable Tank-Car Heaters

Available in 2 and 3 tank-car sizes. Oil-fired with exclusive four-pass flue travel; dry-coil steam condensate return under pressure — no water or heat loss. Provides a portable source of steam wherever needed.

Cleaver-Brooks

Pioneers and Originators of ★TANK CAR HEATERS ★BITUMINOUS BOOSTERS ★AUTOMATIC STEAM-PLANTS

LITTLEFORD

LB — BLACK TOP ROAD MAINTENANCE EQUIPMENT — SINCE · 1900

"SPRAY MASTER"

The Master of Road Building

When building or maintaining Roads, Streets, Highways or Airport Runways let the "Spray Master" speed up work; cut the cost af applying Tar, Asphalt, Emulsions or Road Oils.

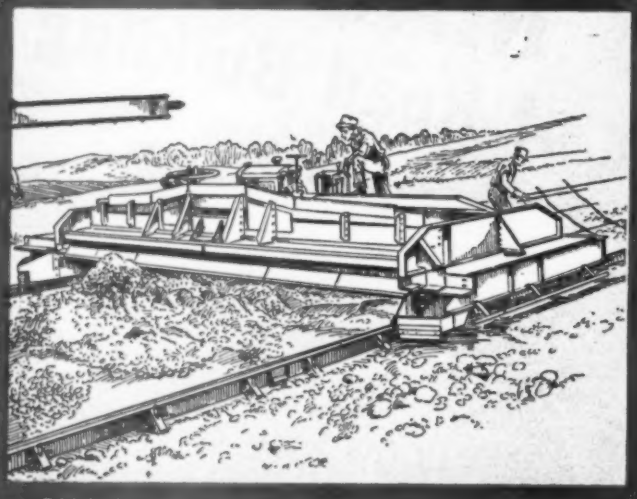
The "Spray Master" with the *Vacuum Flow Full Circulating Spray Bar* is one of the fastest and most efficient spraying units ever designed. This Circulating Bar circulates the materials through the Bar by *Vacuum not pressure.* It sprays under pressure with a Bar up to 24 ft. in width.

"Spray Master" is the master of Road Building, have one of these low cost Spraying units on your next road construction job.

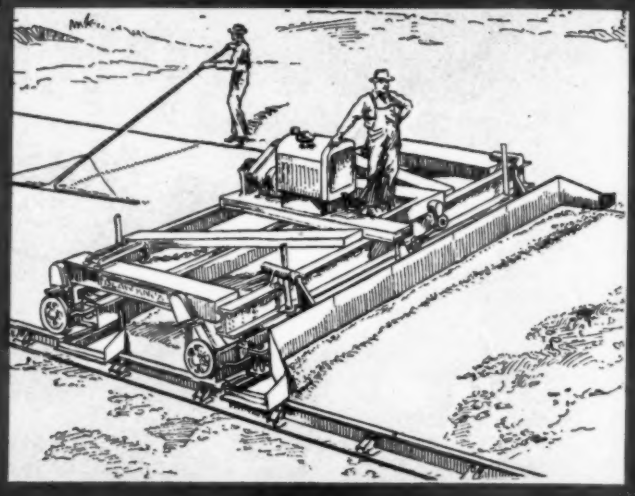
HANDLES HOT OR COLD MATERIALS

LITTLEFORD BROS., INC....454 EAST PEARL ST., CINCINNATI, OHIO

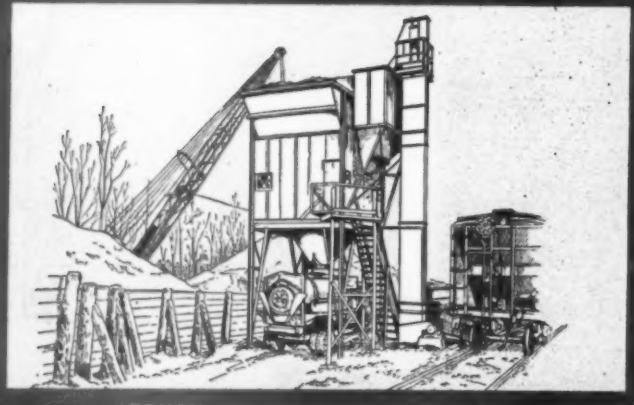
BLAW-KNOX HAS THE ANSWERS TO



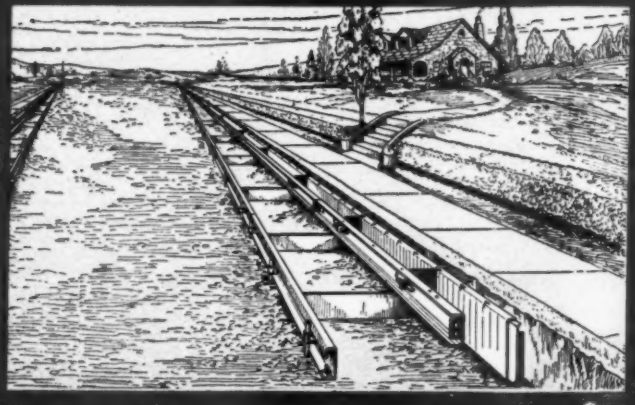
PAVING SPREADERS FOR ROADS AND AIRPORTS



FINISHING MACHINES FOR ROADS AND AIRPORTS

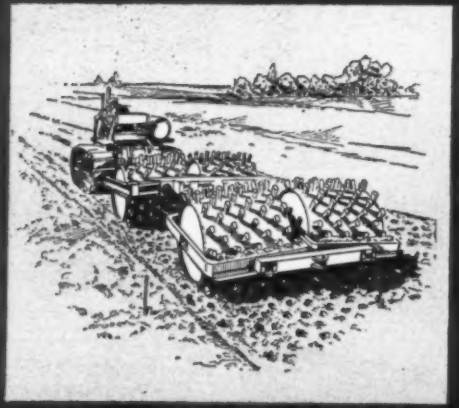


TRUCK MIXER LOADING PLANTS

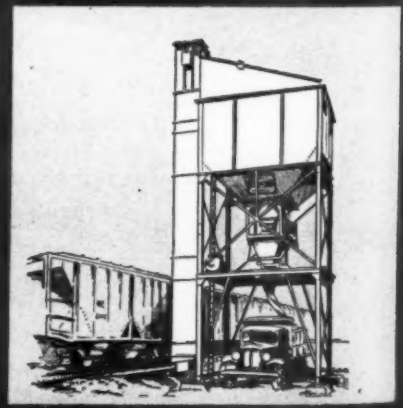


STEEL STREET FORMS

AGGREGATE BATCHING PLANTS

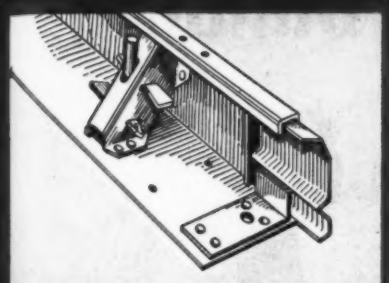


SHEEPSFOOT TAMPING ROLLERS



BULK CEMENT PLANTS

FASTER CONSTRUCTION



PAVING FORMS FOR ROADS AND AIRPORTS

CLAMSHELL BUCKETS

CONCRETE BUCKETS

Blaw-Knox Equipment is first choice of construction men who have a reputation for getting projects completed in a hurry and at lowest possible cost.

Modern and rugged design endows Blaw-Knox Construction Equipment with production capacities that were unheard of heretofore.

You'll find this trouble free equipment hard at work building roads, airports and general concrete construction all over the world.

Your nearest Blaw-Knox Distributor will handle your inquiry promptly and efficiently.

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Here's what CECO gives you for faster low-cost road building

ACCURATE PRE-BIDDING INFORMATION

Ceco takes the guesswork out of bidding by supplying accurate data, so you can bid to get the job . . . and make money on it, too.

BLUEPRINTS OF ENGINEERING DETAILS

Ceco engineers do the detail work for you in supplying all engineering data on reinforcing and other materials for the job.

ONE ORDER DOES IT ALL

Ceco streamlines roadbuilding. In one complete order you can specify everything you need. Material is delivered as wanted and on time.

Metal center strip in place; dowel bars supported and ready for support; expansion joint in position.

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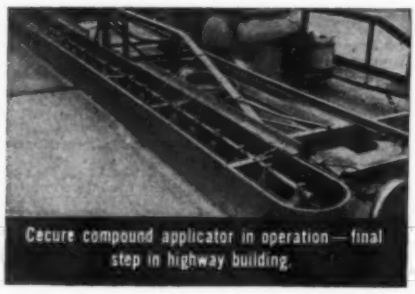
There is a nationwide network of Ceco offices to serve you. So when you specify Ceco Highway Products, you know you get fast, dependable delivery from the nearest convenient warehouse . . . and always there's a Ceco engineer watching every detail . . . saving you time and money. Yes, here's highway service that's everywhere at once.

Placing the welded wire fabric, illustrating ease of handling.



Cecure compound applicator in operation—final step in highway building.

Investigate Ceco Cecure Curing Method

Ceco's new Cecure applicator offers these advantages:

1. **Gives positive application of Cecure curing compound.**
2. **Works 20 times faster than old style method.**
3. **Provides uniform curing — reducing danger of cracking.**
4. **One operation does the job.**

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***Highway Products Division*—5701 W. 26th St., Chicago, Ill.**

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Welded Wire Fabric • Metal Center Strip • Dowel Bars • Stake Pins • Dowel Bar Supports • Expansion Joints • Dowel Bar Sockets • Cecure Compound • Sub-Grade Paper

ENGINEERING MAKES THE BIG DIFFERENCE IN CECO CONSTRUCTION PRODUCTS

Through the war years, the cost of the job was secondary to *getting that job done.* But from now on, COST—both operating and maintenance—will be the all-important factor in the purchase of new heavy-duty earth moving and material handling equipment. When it comes to deciding what kind of power will operate that equipment at lowest cost, don't overlook the proved-on-the-job advantages of high-speed Cummins Dependable Diesels . . . their demonstrated reliability and long life . . . their easy, economical maintenance and service . . . their high horsepower output per pound of engine weight. Models for all types of power applications . . . automotive, portable or stationary . . . 50 to 275 hp.

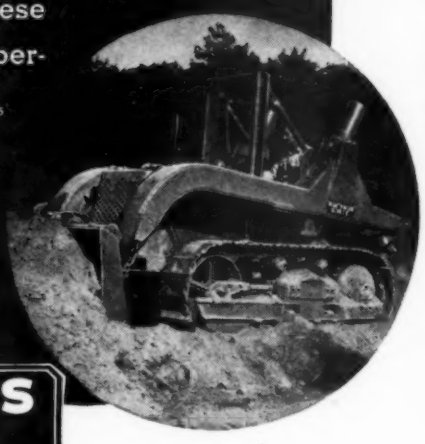
CUMMINS ENGINE COMPANY, INC.
Columbus, Indiana

You're 'Ready for Anything' with the

DOZERSHOVEL

WITH the flexible Bucyrus-Erie Dozershovel you're ready for anything in the line of handling bulk materials because you have at your command the functions of three machines: a small power shovel, a bulldozer, and a yard crane. The shovel bucket gives you speedy scooping, lifting, carrying, and loading service; the easily interchanged bulldozer blade provides fast digging, leveling, grading; handy yard-crane service is supplied by means of the crane-hook welded to both bucket and blade. Investment in one gives you the work of three — a big reason why the Dozershovel is always busy making money for you! . . . There are plenty of other reasons, too: full front visibility, balanced design, low overhead clearance, oscillating tracks, positive down pressure, simple rugged construction. Ask your International TracTracTor Distributor about these and other features that mean money-making performance on a wide range of jobs.

15T45



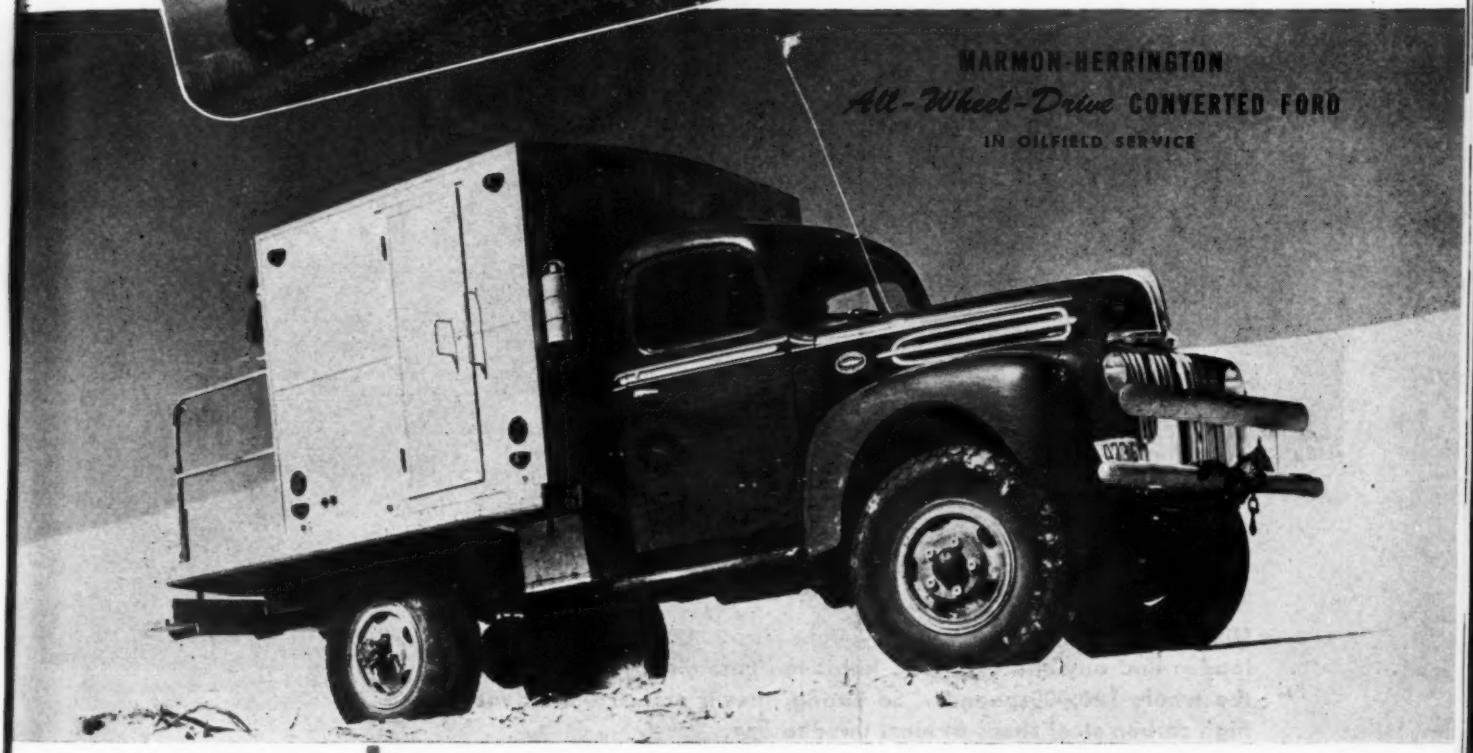
BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

See Your

INTERNATIONAL TRACTRACTOR DISTRIBUTOR

WORLD'S BIGGEST VALUE IN *All-Wheel-Drive* TRUCKS . . .



Marmon-Herrington Cab Over Engine, six-wheel-drive converted Ford.

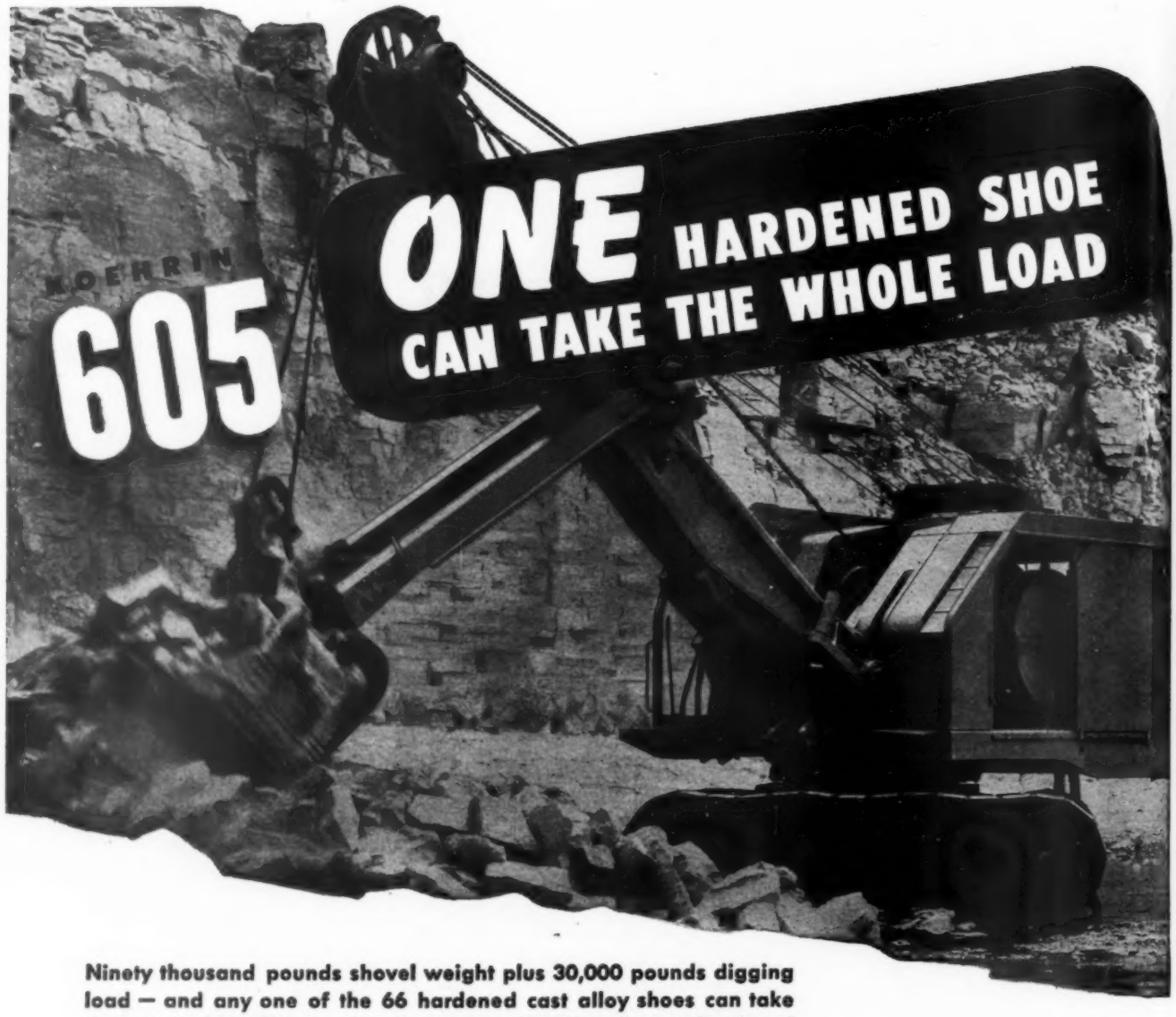
Marmon-Herrington 1½ ton All-Wheel-Drive converted Ford with dump body and under-body blade.

Goes Anywhere a Tank Can Go

● Here's the truck that is "made to order" for the toughest jobs in the road construction, road maintenance, snow removal and similar services—the truck that out-performs all others in mud, sand and snow and up steep grades. It is the truck that oil field operators, loggers, miners, and public utility crews give unending praise. Tested over the same hills, sand pits and marshes used for proving the famous Marmon-Herrington combat tanks, it goes anywhere the tanks could go—stands up to the same "punishment." These trucks are now coming off the line. Either 4-wheel-drive or 6-wheel-drive. Write for complete information.

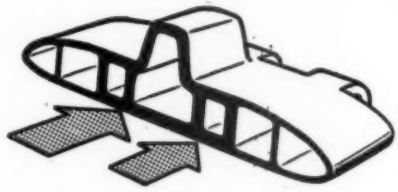
MARMON-HERRINGTON COMPANY, INC.
INDIANAPOLIS 7, INDIANA

MARMON-HERRINGTON *All-Wheel-Drive* **TRUCKS**



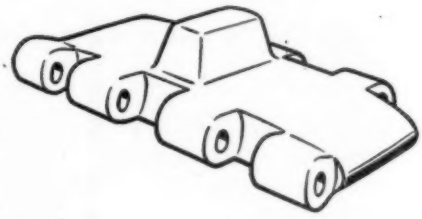
Ninety thousand pounds shovel weight plus 30,000 pounds digging load — and any one of the 66 hardened cast alloy shoes can take the whole 120,000 pounds. So strong, they'll outlast unhardened high carbon steel shoes at least three to one.

Double Thick WHERE THEY TAKE THE LOAD



Cross section shows double thick crawler roller paths, rigidly supported by double thick inside ribs. Cast, seamless, this shoe takes loads as a unit. Heat-treated alloy has basic strength, ductility to ride out shock loads, hardness to resist abrasion.

Self-Cleaning, OF COURSE! NO DIRT TRAPS

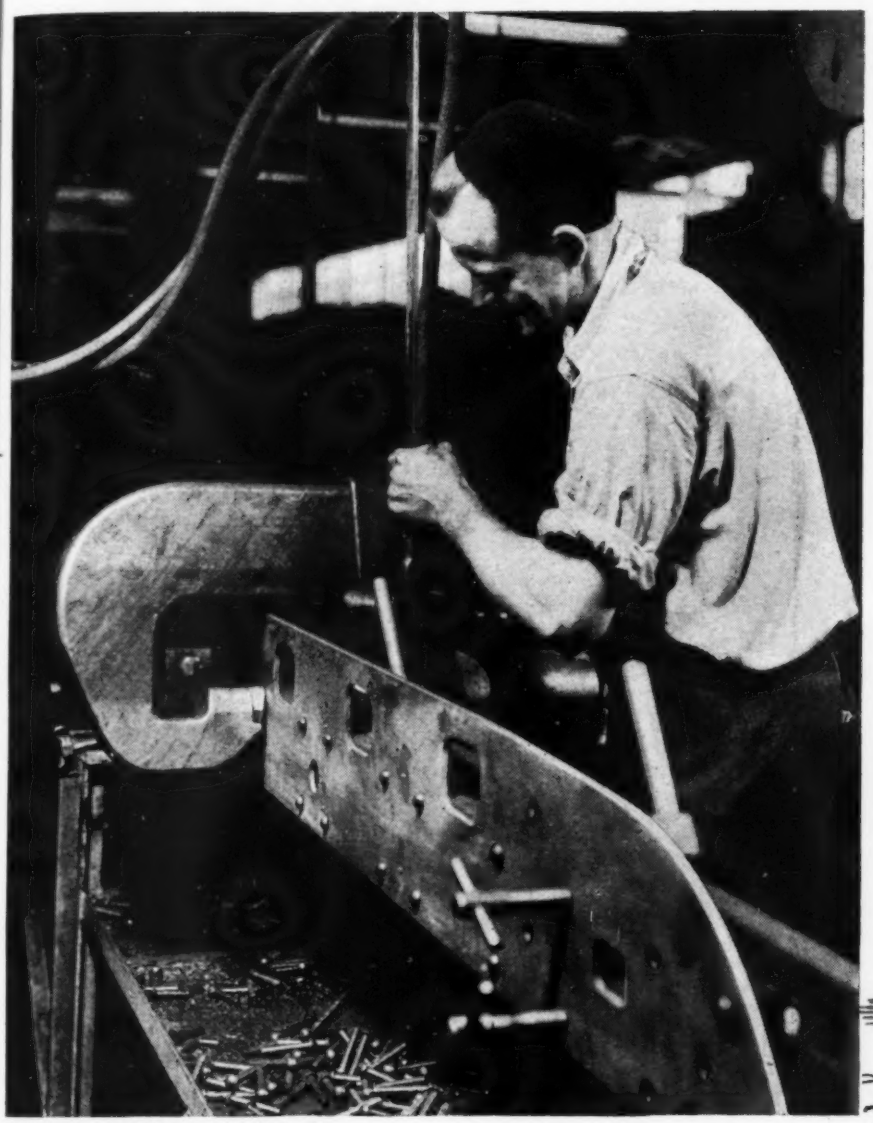


Like the shoes on Koehring equipment for 25 years, the hardened cast alloy shoes on the Koehring 605 have no dirt traps. Smoothly streamlined, they shed mud and stones and won't shower grit on the crawler belt rollers.

KOEHRING COMPANY • *Milwaukee 10, Wisconsin*

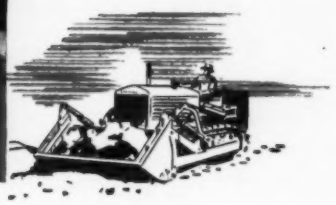
KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT



Cold riveting track frames with a Hydraulic Yoke Riveter in the Oliver "Cletrac" plant.

Added attraction!



To provide greater resistance to shocks, strains and twists of crawler tractor operation, the track frames of Oliver "Cletrac" tractors are reinforced with sections of heavy plate steel . . . an "added attraction" that adds years of dependable service.

Strategically located to provide greatest strength, these steel sections are securely riveted in place by modern hydraulic riveters. This *extra* protection is typical of the many added features that are standard on Oliver "Cletrac" tractors. Through the use of the most modern equipment and production methods, quality is built in . . . high cost is engineered out.

Maintenance of this standard enables your Oliver "Cletrac" dealer to offer you the finest in crawler tractors . . . for your every need.

CLETRAC THE OLIVER CORPORATION Cletrac

a product of **The OLIVER Corporation**

When the job takes POWER-

use a LINK-BELT SPEEDER SERIES 300

This big, powerful machine is fast and easy to handle, a combination that really piles up the tonnage! With Speed-O-Matic hydraulic control to give finger-tip operation, you get results without wearing down the operator. For more work per day — and more work per gallon — take a LINK-BELT SPEEDER Shovel-Crane-Dragline.

Quickly interchangeable for various special operations, your Link-Belt Speeder is the *first machine on the job, and the last to leave.* You get full return on your investment in a Link-Belt Speeder.

CLAMSHELL

CONCRETE BUCKET

STEEL ERECTION

DRAGLINE

For Prompt, Efficient, Convenient Sales and Service:
There is a Link-Belt Speeder Distributor Located Near You

10,151

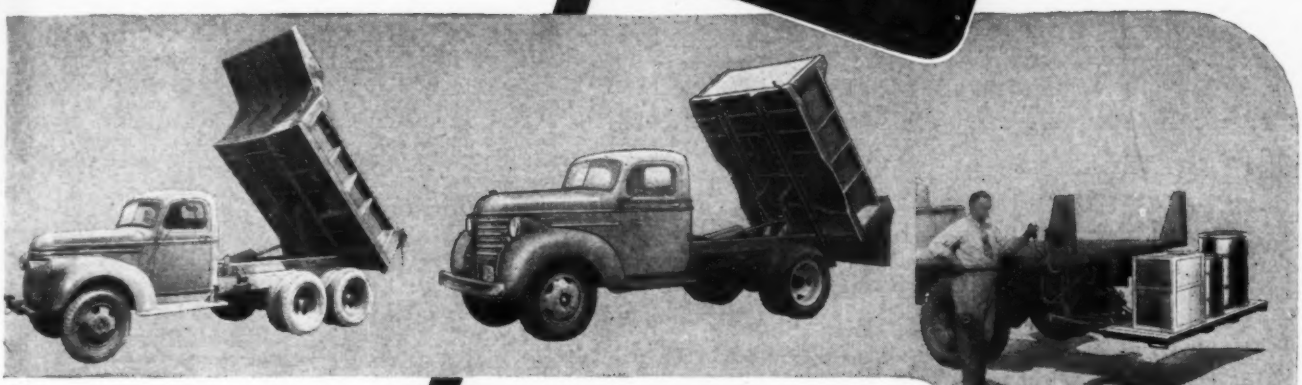
LINK-BELT SPEEDER

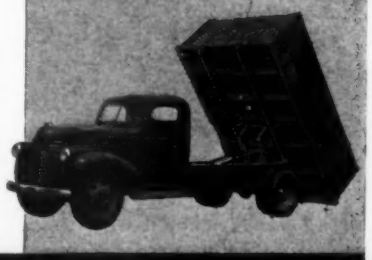
Builders of the Most Complete Line of
SHOVELS-CRANES-DRAGLINES

LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO 9, ILL.
(A DIVISION OF LINK-BELT COMPANY)

Anthony HAS IT...

CONSTRUCTION EQUIPMENT THAT KEEPS TRUCKS ON THE MOVE





Features that mean greater service and give a dependable reserve of power for that extra effort construction work demands, are built into the Anthony line . . . Anthony "Super" Hydraulic Hoists and Dump Bodies, 5 to 30 tons, for conventional and C.O.E. trucks, 6 wheelers and semi-trailers . . . Anthony Hydraulic Lift Gates to speed up loading and moving of equipment and materials . . . Anthony all steel Material Spreaders cut road building and maintenance costs. Ask your truck dealer to show you the Anthony features that keep trucks on the job.

ANTHONY HYDRAULIC

Manufactured by **ANTHONY CO.** Streator, Illinois

IN THE THICK OF POSTWAR CONSTRUCTION-

LOOK FOR THESE FAST — POWERFUL

MARIONS

TYPE	CAPACITY
331	3/4 cu. yd
362	1 1/2 cu. yds.
372	1 3/4 cu. yds.
93M	2 1/2 cu. yds.
40A	3 cu. yds.
492	3 cu. yds.
111M	3 1/2 - 4 cu. yds.
4161	5 cu. yds.
151M	6 cu. yds.
7200 Walking Dragline	6-7 cu. yds.
7400 Walking Dragline	10-12 cu. yds.

DIESEL • GASOLINE • ELECTRIC

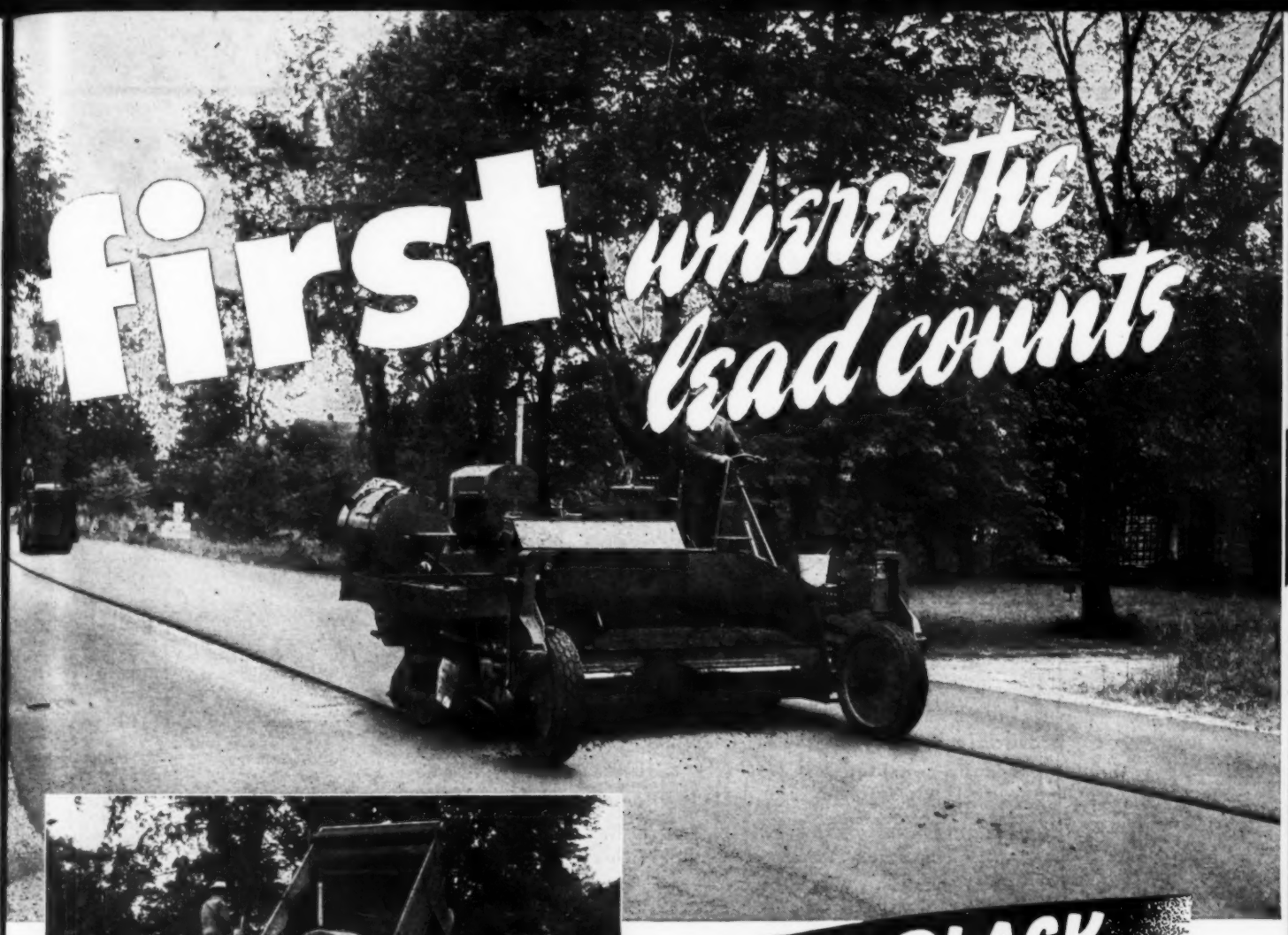
WHAT IS YOUR MATERIAL HANDLING PROBLEM?

THE MARION STEAM SHOVEL COMPANY

MARION, OHIO

Offices and Warehouses in all Principal Cities

3/4 cu. yd. to 40 cu. yds.



ADNUN BLACK TOP PAVERS

ADNUN PAVERS were first in the field and have kept the lead where improvements mean dollars saved to road builders. Adnun is the first and only paver suitable for laying slag, soil cement, gravel and crushed rock in addition to any bituminous material—hot or cold. . . . First with a big 6-cylinder, 50 h. p. engine capable of handling the biggest loads on any grade with the positive traction of four-wheel drive. . . . Adnun firsts in operating economy are reported by owners* who have used other pavers, and are a direct result of careful design and long job experience.

Continuous Course Correction, oscillating cutter bar, positive strike-off, lever-adjustment for crown, raker bar in hopper for pugmill mixing and breaking action power cut-off . . . all contribute to fast, accurate laying of smoother finished pavement with minimum subgrade preparation and waste. Any width strip, from 6 to 12 feet, any depth, can be laid with minimum preparation of shoulders or subgrade. One man at the hydraulic controls is the Adnun's working crew

For further details on other Adnun Firsts, ask an Adnun owner, see your nearest Foote Distributor, or write direct.

THE FOOTE COMPANY, INC.

1936 State Street **Nunda, N. Y.**

** Names on request.*

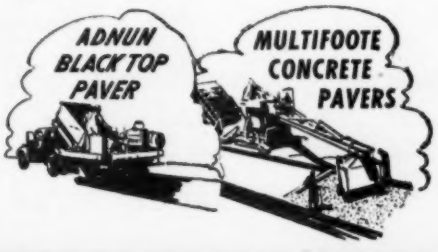
ARMY E NAVY

ADNUN

TRADE MARK REGISTERED

BLACK TOP PAVER

WITH CONTINUOUS COURSE CORRECTION



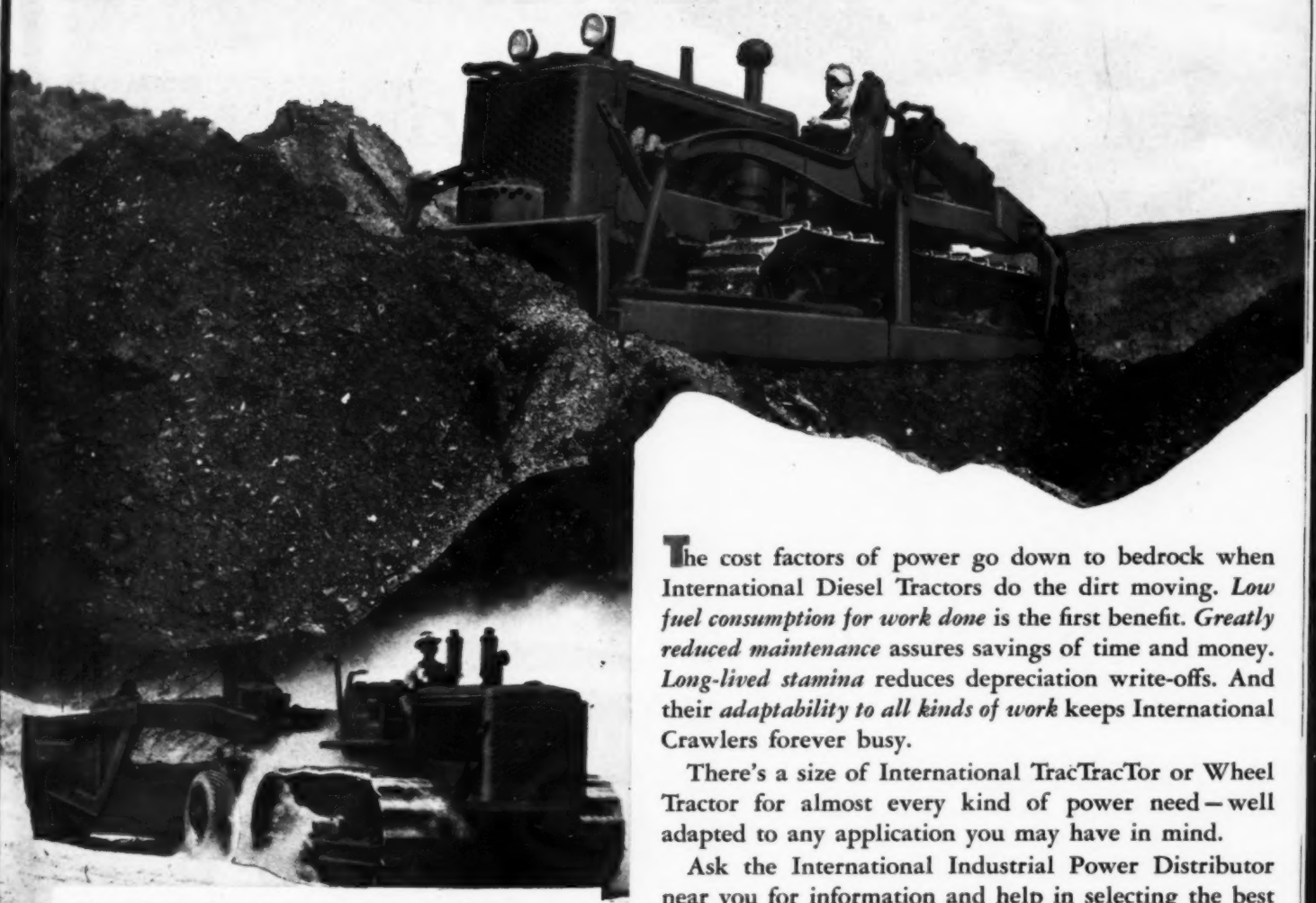
STEEL GOES UP F-A-S-T-E-R WITH A MICHIGAN MOBILE CRANE....

To "make time" on steel-setting jobs you need a crane that can ease cumbersome girders and structural sections into position with speed, accuracy and safety. . . MICHIGAN Mobile CRANES are outstanding for operating ease, stability for handling heavy loads with maximum safety, truck mobility, and many other profit-earning features . . . . Construction activity is due to greatly increase in the near future—have ***you*** modern, cost-cutting equipment which will enable you to ***profitably*** handle ***your*** share? It will pay you to seriously consider MICHIGAN Mobile CRANES and SHOVELS—available in 6 to 12 ton and 3/8 and 1/2 yard capacities, convertible to all standard attachments. . . . Get the facts—write for Bulletin RS-125 today.

MICHIGAN
FINGERTIP AIR CONTROLS
Fast, smooth, positive. Simple, trouble-free, time-tested. Peak operating speeds easily maintained hour after hour — operator fatigue reduced to a minimum.

MICHIGAN
POWER SHOVEL COMPANY
BENTON HARBOR, MICHIGAN

Low Cost Dirt-Moving with
INTERNATIONAL TRACTORS



The cost factors of power go down to bedrock when International Diesel Tractors do the dirt moving. *Low fuel consumption for work done* is the first benefit. *Greatly reduced maintenance* assures savings of time and money. *Long-lived stamina* reduces depreciation write-offs. And their *adaptability to all kinds of work* keeps International Crawlers forever busy.

There's a size of International TracTracTor or Wheel Tractor for almost every kind of power need—well adapted to any application you may have in mind.

Ask the International Industrial Power Distributor near you for information and help in selecting the best power and equipment for the projects you're planning.

Dependable after-sale service is provided all owners of Internationals by distributors and dealer organizations that span the continent and circle the globe. Factory replacement parts and equipment built for use with International Tractors and Power Units are available through these organizations. This assures maximum value and long term benefits for owners and operators everywhere.

Industrial Power Division

INTERNATIONAL HARVESTER COMPANY

180 North Michigan Avenue — Chicago 1, Illinois

We'll see you at the
A. R. B. A. Convention
Chicago, January 14-17.

INTERNATIONAL — Industrial Power

Osgood PROVED IN SERVICE

9-Year-Old Osgood Shovel Brings Top Price in Surplus Equipment Sale

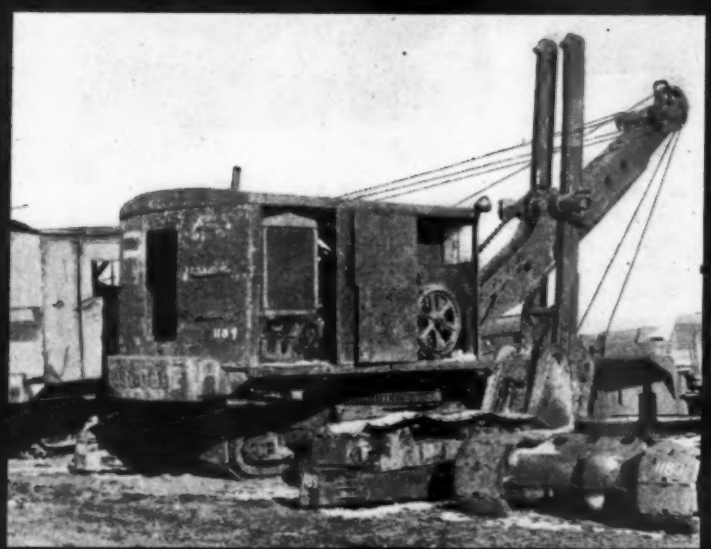
Even after it had gone through nine years of grueling service, this Osgood shovel looked good to the experienced construction machinery dealers who were bidding on it. Every one of the bidders was banking on the stamina built into every Osgood machine . . . they knew that there still were years of service left in this veteran.

That's what engineered design and precision manufacture means—long-lived, dependable, trouble-free service. It's an important fact to keep in mind when you're selecting your new equipment for postwar projects. We'll be glad to send complete information on the complete line of Osgood construction, excavating and materials handling equipment . . . to tell you how and why Osgoods will stay on the job, day after day, turning in better performance records at lower cost.

THE RECORD

Manufactured in 1936, this 1½ yard Osgood shovel had already turned in nine years of faithful service when it was offered at a recent surplus equipment sale. The bidders, experienced construction and excavating machinery dealers, knew the machine had been in service on the Alcan highway project for nearly two years; working under the most adverse conditions, with only sketchy provisions for maintenance. This Osgood, nine years old and offered "as is," brought the highest price of any of the 1189 pieces of equipment in the sale!

THE MACHINE



THE GENERAL EXCAVATOR COMPANY
CRANES, DRAGLINES AND SHOVELS
DIESEL, GAS, ELECTRIC

Associated with The General Excavator Company

OSGOOD — CRANES-SHOVELS — MARION, OHIO, U.S.A. — OSGOOD GENERAL

THE OSGOOD COMPANY • MARION, OHIO

ARMY E NAVY

OSGOOD
SHOVELS, DRAGLINES
CRANES

WHY THE COST PER TON IS LOWER WITH A B-G CENTRAL ASPHALT PLANT

The high daily output of this Barber-Greene Central Plant brings down the cost per ton of bituminous mix.

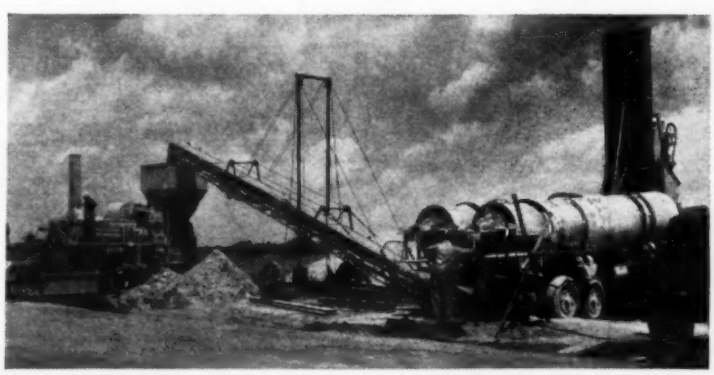
Continuous, straight-in-line, automatic measuring and mixing keeps production at the peak, hour after hour.

You'll find that the capacity of a B-G Central Plant is higher—size for size, weight for weight, investment for investment—than any other outfit you can buy. What's more, you can hook up any combination of these individual, carefully engineered, portable B-G units that best meets your construction conditions and specifications.

Complete portability means further savings—in transportation time and expense. You can locate at the most economical point . . . reduce truck mileage . . . increase your margin of profit on the smaller jobs. Several sizes available according to your requirements. Barber-Greene Company, Aurora, Illinois.

Above: A complete B-G Central Plant for production of highest type mixes, with Reciprocating Feeder, Cold Elevator, Dual Drum Dryer, Dual Cyclone Dust Collector, Hot Elevator, Gradation Control Unit, and Mixer.

Right: Here's one of the combinations for turning out "intermediate" type mixes. Gradation Control Unit is omitted. This set-up bridges the gap between high-type mixes and the "low cost" type of road mix construction.



45-19

Barber-Greene B G *Constant Flow Equipment*

BARCOS

ARE BUSY BUILDING INDUSTRY BIGGER

On industrial projects all over the country, Barco Portable Gasoline Hammers are helping break ground . . . speeding production. Light, easy to handle, adaptable to many different jobs, Barco is a modern tool, designed for modern conditions. Owners report faster work at lower cost when Barco is used. Eleven special tool attachments. Full information on request.

BARCO MANUFACTURING COMPANY, NOT INC., 1815 Winnemac Ave., Chicago 40, Ill. • In Canada: The Holden Co., Ltd., Montreal, Can.

THEY'RE HERE!

NEW LPC CARRIMORS*

...IN 8 AND 14 YARD SIZES!

COMPLETELY NEW FROM THE GROUND UP AND THOROUGHLY PROVED BY 2 YEARS OF TESTING

Everyone who has seen these new LaPlant-Choate scrapers in action has been quick to admit that "they have all the good points of other rigs—*and a lot more besides.*" Moreover, on scores of tough earthmoving jobs from coast to coast, these greatly improved cable outfits are proving far superior to competitive equipment in all phases of operation. But don't take our word for it. Ask your nearest LaPlant-Choate "Caterpillar" distributor to take you to see the new LPC's working. Then you'll learn why so many agree on LPC for *lowest possible cost per yard*—wherever tractor-drawn scrapers are indicated. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa; San Leandro, California.

*Reg. U.S. Pat. Off.

ONLY Scrapers in the World with ALL These Profit-Making Features

Easier Loading

Because of generous initial apron opening without movement of rear gate. Curved bowl design plus smooth interior and special offset cutting edges produce continuous "fountain action" in loading, while exclusive eccentric hoist sheaves permit effective "pumping" in loose material.

Easier Hauling

Thanks to lower draft, shorter wheel base and elimination of excess weight. Newly designed apron retains load under all conditions.

Faster, Cleaner Dumping

Because of positive forced ejection. Rear gate actually bulldozes the material out, scraping bottom and sides of bowl perfectly clean. High lifting apron moves ahead with rear gate, assuring speedy unloading of all materials, without sticking or jamming.

More Accurate Spreading

Assured by improved positive control.

Greater Stability

Thanks to low center of gravity and freedom from bulky overhead structures.

Greater Utility

Because wide, open-top bowl also permits overhead loading with shovel, drag-line or bin.

LAPLANT CHOATE
EARTHMOVING AND LAND CLEARING EQUIPMENT

Better Trucks for YOUR Business!

"We Marvel at the Endurance Built into Ford Trucks"

Certainly few operators are in a better position to judge over-all truck quality than Dodge Construction, Inc., . . . which makes this cordial letter from Mr. E. J. Maupin, Jr., president, mighty convincing evidence that Ford Trucks really pay out on the job. Mr. Maupin wrote:

"Our business is constructing highways, airports, etc. Our 18 four-yard Ford Dump Trucks, carrying six-ton loads, have had tough going. Competitive trucks on the same jobs just 'can't take it' like the Fords. The latter keep right on running. We marvel at the 'staying on' qualities built into these trucks. And almost every town has a Ford Dealer who seems to feel it is his duty to exert every energy to provide the best of service. We want more and more Fords."

See the new Ford Trucks—especially the new Ford Heavy Duty dump truck chassis. Consider their rugged construction—frame, springs, axles, transmissions, clutches, universals . . . their 100 HP V-8 or 90 HP six-cylinder engines, with important engineering advancements. What you see will convince you that Ford Trucks can make profits in your business, too.

Ford

ADVANCED ENGINEERING IN NEW FORD TRUCKS

More Economy and Endurance
Easier Servicing

A STILL GREATER 100 HP V-8 ENGINE with NEW Ford steel-cored Silvaloy rod bearings, more enduring than ever in severe service • NEW aluminum alloy cam-ground 4-ring pistons for oil economy • BIGGER, more efficient oil pump and IMPROVED rear bearing oil seal • NEW longer-lived valve springs • NEW improvements in cooling • NEW efficiency in ignition • in carburetion • in lubrication • in ease and economy of servicing operations • And available in all truck chassis except C.O.E. units—the rugged, thrifty 90 HP FORD SIX-CYLINDER ENGINE, with many important advancements.

FORD CHASSIS ADVANTAGES: Easy accessibility for low-cost maintenance • Universal service facilities • Tough, forged front axles • Extra-sturdy rear axles with pinion straddle-mounted on 3 large roller bearings, ¾-floating type in light duty units, full-floating in all others • 3 axle ratios available (2 in 1-ton unit) • 2-speed axle available in heavy duty units at extra cost • Powerful hydraulic brakes, large drums, cast braking surfaces • Rugged 4-speed transmission with NEW internal reverse lock optional at extra cost on light duty units, standard on all others.

FORD TRUCKS

MORE FORD TRUCKS ON THE ROAD • ON MORE JOBS • FOR MORE GOOD REASONS

World-Wide Service on Hyster Tractor Equipment By More than 300 "Caterpillar" Distributors and Dealers

AT Nairobi, British East Africa, at Walla Walla, Washington, and more than 300 cities in between, owners of Hyster Tractor Equipment get quick and efficient service through "Caterpillar" distributors and dealers.

This 15-year-old program of globe-circling parts and mechanical maintenance service is predicated on two facts:

1. **Hyster Tractor Equipment is designed and manufactured for "Caterpillar" track-type tractors.**
2. **Every "Caterpillar" distributor or dealer is a Hyster dealer.**

When you buy a Hyster winch, yarder, logging arch, sulky or the new Hystaway, you have the assurance of friendly, intelligent cooperation on service as well as sales from men who know—"Caterpillar" distributors and dealers all over the world.

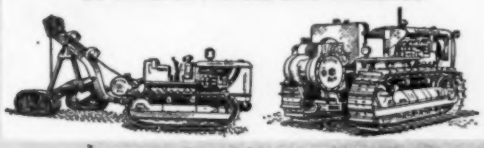
HYSTER

FOR ANY LIFT OR PULL

HYSTER COMPANY

2995 N. E. Clackamas, Portland 8, Ore.
1895 N. Adams Street, Peoria 1, Illinois

World's Largest Manufacturer of Tractor Hoists and Winches



Heil Hi-Speed Bottom Dump Wagons

...famous for *big capacity, hi-speed, off-the-road* hauling

You can maintain "stepped-up" schedules on dirt-moving with a Heil Hi-Speed Bottom-Dump Wagon — because you haul *faster* (up to 27 m.p.h.), and you haul *bigger loads* (17 yards).

Many time-saving features

The big capacity cuts spotting delays; the big open top speeds the loading cycle. The hydraulic power steer gives you quick maneuverability. The wide tread, low center of gravity, and high hitch point give stability, for safe operation on fast hauls.

Doubles with a scraper

The 15-yard Heil Hi-Speed Scoop is quickly and easily interchangeable with the dump wagon equipment. By using both Dump Wagon and Scraper with one power unit, you save on capital investment, increase your job capacity, and fit your equipment to lowest cost operation — on any dirt-moving job.

Doors power-opened in 2 seconds

Dumping is under fingertip control — all in one heap, or with an even spread. With the doors wide open, operating on a clamshell principle, you get a 35-inch clearance — so that the operator can dump his load and get away in a flash. The operator can turn off the windrow at sharp angles whenever he chooses.

Do a little figuring right now, and see what this means to you in dollars and cents and a reputation for clean-looking, on-time completions. For complete details . . .

See Your Nearby Heil Distributor

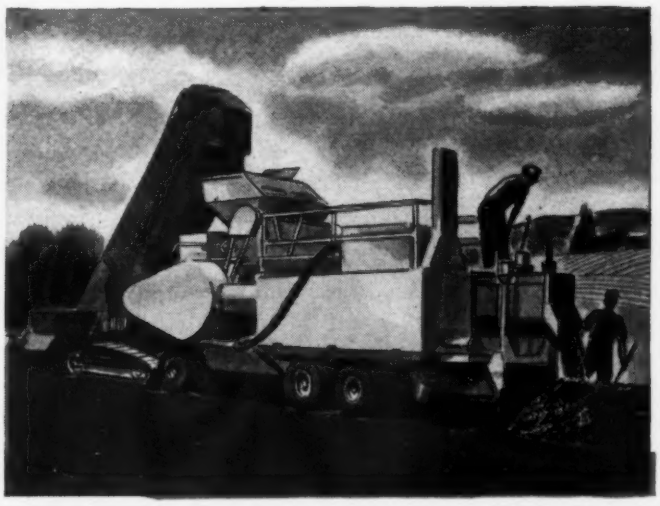
THE HEIL CO.
GENERAL OFFICES • MILWAUKEE 1, WISCONSIN

R-57

Heil Earth-Moving Machinery

• Trailbuilders • Bulldozers • Cable Scrapers • Sheepsfoot Tamping Rollers • Hi-Speed Wheel Tractor with Semi-Trailer Scraper or Semi-Trailer Bottom-Dump Wagon.

Blackhawk Hydraulics are ON THE ROAD



. . . Under Finger-Tip Control

for easy operation and accurate control

TOUGH road work demands the rugged, dependable, safe performance of Blackhawk Hydraulic Controls. Fingertip pressure on a conveniently located lever puts tons of actuating power to work, lifting and lowering — safely, speedily and accurately. Blackhawk pumps, rams and valves are built to take it and to dish it out. Many leading road equipment manufacturers build with Blackhawk Controls as standard equipment. You'll find it "easy going" on the road if you specify Blackhawk Hydraulics on all your equipment. For complete information on the advantages of Blackhawk Hydraulic Controls, write your equipment manufacturer.

A Product of **BLACKHAWK MFG. CO., Dept. RS, Milwaukee 1, Wisconsin**

Power-Driven P-104
Power-Packer Pump—belt or gear driven — control valve is operated from cab. Compact, easily installed.

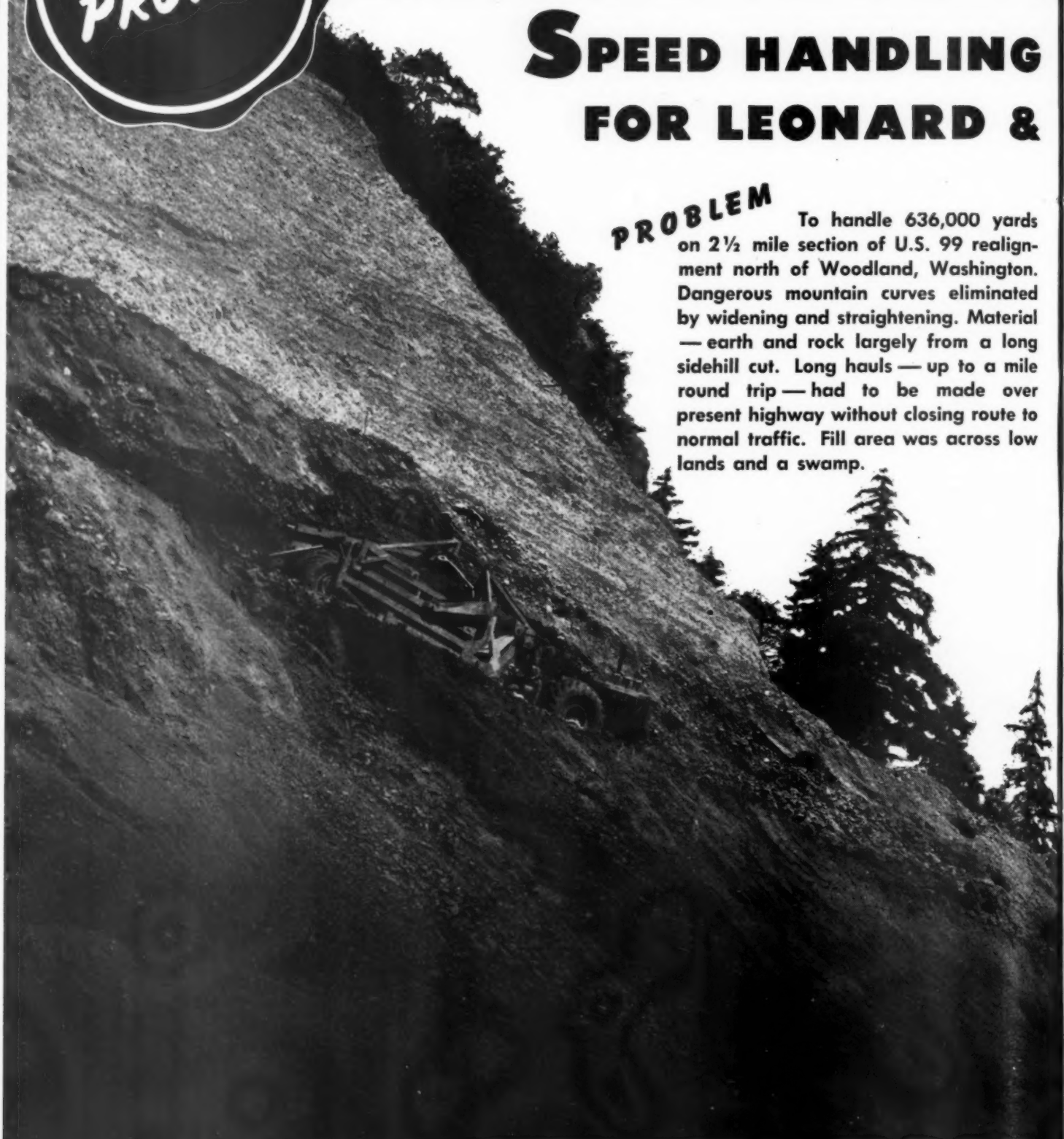
Hand Operated P-60
Power-Packer Pump—mounts in cab. Blackhawk is also the source for RAMS and VALVES used with these pumps.

BLACKHAWK
Hydraulic EQUIPMENT

JOB-PROVED

TOURNAPULLS

SPEED HANDLING FOR LEONARD &



PROBLEM To handle 636,000 yards on 2½ mile section of U.S. 99 realignment north of Woodland, Washington. Dangerous mountain curves eliminated by widening and straightening. Material — earth and rock largely from a long sidehill cut. Long hauls — up to a mile round trip — had to be made over present highway without closing route to normal traffic. Fill area was across low lands and a swamp.

Manufacturers of Tournapulls*, Angledozers*, Bulldozers, Tiltdozers*, Carryall* Scrapers, Power Control Units, Rooters*, Tournatrailers*, Tournacranes*, Tournatrucks*, Sheep's Foot Rollers, Tournarope*, Tournaweld*, Tournalifts*. * Trade Mark Reg. U. S. Pat. Off.

LETOURNEAU

PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

S ...TOURNATRAILERS

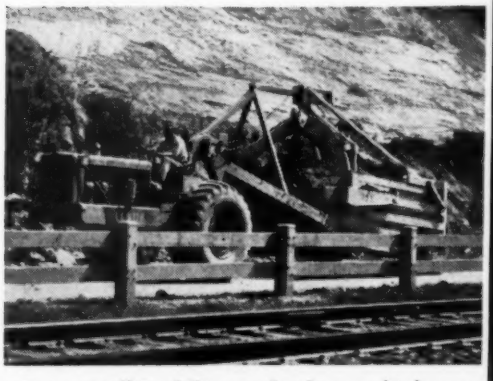
OF 636,000 YD. JOB SLATE ON U.S. 99

SOLUTION To profitably meet these difficult job conditions of steep grades, tough materials and open-traffic haul route, Contractors Leonard & Slate used 8 rubber-tired, fast-moving Tournapulls, with them moved most of the yardage. 5 Tournapulls with 15-yard Carryalls handled tough rocky scraper "dirt"; 3 with 17-yard Tournatrailers hauled shovel rock and slide material. These big rubber-tired rigs provided plenty of traction in the rough cuts and up steep grades, high hauling speed on the pavement and good flotation in the soft swampy fill. Rooting, clearing, pioneering and other specialized jobs were handled with supplementary LeTourneau tractor tools.

RESULTS Thus, Leonard & Slate moved about 95% of the total job yardage with their LeTourneau fleet. Typical production in tight, rocky hardpan, which had to be rooted, showed each Tournapull-Carryall rig averaged 55 pay yards per hour on a 4600' round trip haul. This, in spite of 18 to 20% return grades plus delays entering heavy traffic stream on main highway haul.

Profitably handling rugged jobs with Tournapulls is not new to Contractors Leonard & Slate. They originally used 6 smaller Tournapulls on some of the West's toughest jobs. C34X

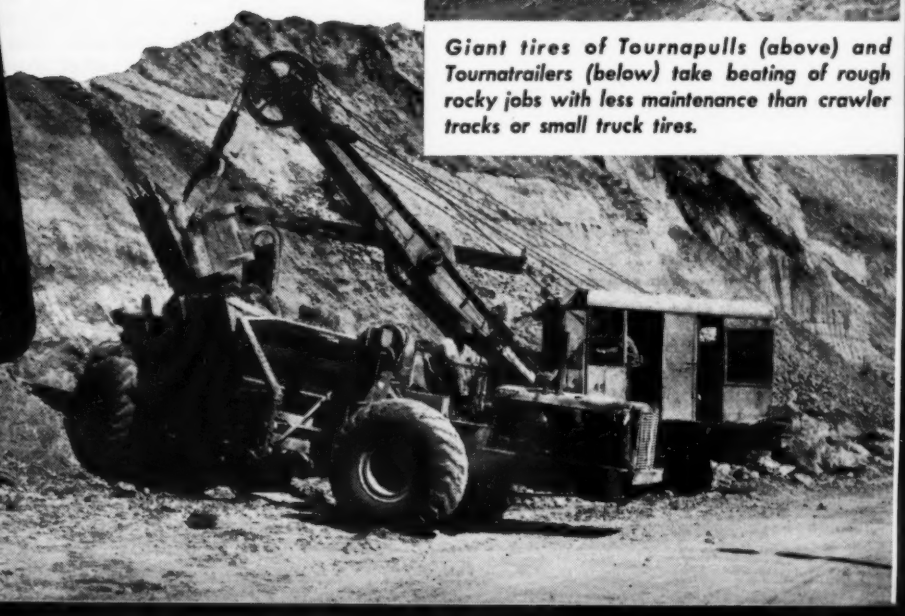
Tough rocky hardpan was loosened by LeTourneau heavy duty Rooter using two teeth.



Tournapulls' ability to haul over highway without traffic interference or damage to pavement saves time, cuts haul road expense.

Giant tires of Tournapulls (above) and Tournatrailers (below) take beating of rough rocky jobs with less maintenance than crawler tracks or small truck tires.

INVESTIGATE check the extra profit possibilities of Tournapull as your major dirtmoving equipment . . . this is the modern job-proved method . . . it is simpler, more flexible . . . faster on both long and short hauls . . . it has proved its ability to give lowest net costs per yard! For facts and figures, see your LeTourneau distributor today.



TRUSCON WELDED STEEL FABRIC

Equalizes Load Stress and Helps Maintain High Road Efficiency

Structural Action at Crack in Plain, Non-Reinforced Pavement.

As wheel load approaches crack in plain pavement, loaded slab end carries entire load with no assistance from non-loaded slab.

Structural Action at Crack in Truscon Welded Steel Fabric-Reinforced Pavement.

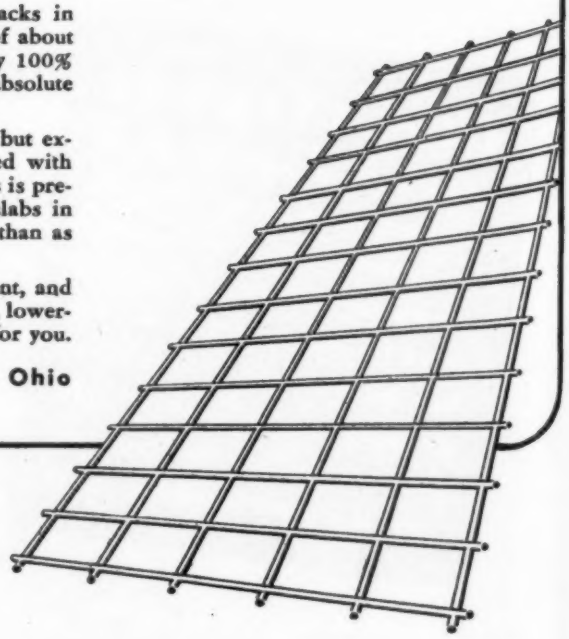
As wheel load approaches closed crack in reinforced pavement, aggregate interlock renders the crack-joint shear resistant, and both slab ends, instead of one, carry the load.

AUTHORITATIVE and official loading tests prove that cracks in reinforced pavements consistently average a load transfer of about 48% at all seasons of the year. This value represents practically 100% shear-resisting capacity, since a load transfer of 50% is the absolute maximum that could theoretically occur under any conditions.

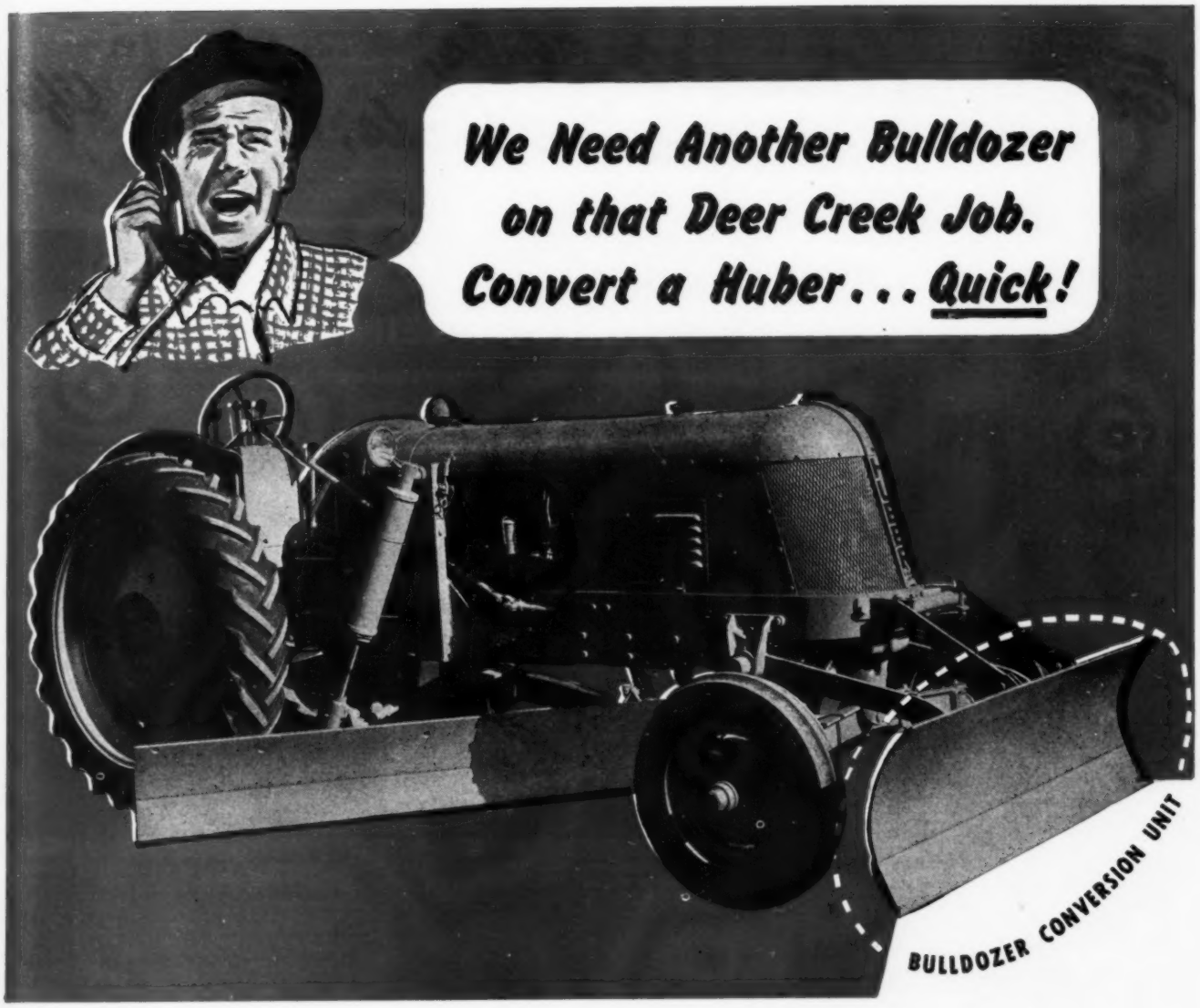
Cracking in concrete pavements cannot be eliminated entirely, but experience has proved that when the pavement slab is reinforced with Welded Steel Fabric between joints, the formation of wide cracks is prevented. The reinforcing holds the aggregate of the fractured slabs in close contact and enables the slab to function as a unit rather than as individual parts.

You can be *sure* that Truscon Welded Steel Fabric Reinforcement, and associated Truscon steel roadbuilding products, will build better, lower-cost roads for the communities you serve, and greater prestige for you.

TRUSCON STEEL COMPANY • Youngstown 1, Ohio
Subsidiary of Republic Steel Corporation



TRUSCON
Reg. U. S. Pat. Office
WELDED STEEL MESH
Covers the Continent



Just connect the bulldozer conversion unit illustrated here to a Huber Maintainer . . . it's as simple as that . . . and you have a bulldozer which will move plenty of dirt for you . . . and move it fast! Huber's bulldozer unit has a 6' blade, 20" deep, which can be raised and lowered hydraulically from 20" above to 1" below ground level. There's plenty of push behind it, too—thanks to the Maintainer's sturdy, dependable 32 horse engine. Why not ask your nearest Huber distributor for a bulldozer demonstration . . . today?

THE HUBER MFG. COMPANY • MARION, OHIO, U. S. A.

HUBER

3 WHEEL & TANDEM ROLLERS

YEAR 'ROUND MAINTAINER

For Wider Concrete Slabs, Heavier Loads, Longer Life

—THE MOST-WIDELY USED CONCRETE REINFORCEMENT

In this fine road, and in many other miles of concrete highway all over the country, American Welded Wire Fabric fortifies the concrete slabs in all directions. It reduces cracking, restrains progressive breakage, assures additional years of trouble-free service.

Runway A, the two-miles long, two hundred-feet wide, twelve-inches thick main runway at Idlewild Airport is built in lanes twelve and one-half feet wide. These men are placing a sheet of American Welded Wire Fabric in the concrete slab.

Engineers make long life and economy doubly certain in these big sewers, by using American Welded Wire Fabric Reinforcement. In these concrete pipes, as in many other important installations at Idlewild Airport, long life and low maintenance costs are assured.

MILLIONS of square feet of concrete highway slabs reinforced with American Welded Wire Fabric have been giving satisfactory service during the past twenty years. And it will prove an equally wise choice for new concrete roads and airport runways, whose wider lanes will carry heavier allowable loads.

This superior reinforcement — closely spaced, cold drawn wires of high yield-point steel, prefabricated by electric welding — fortifies the concrete slab in all directions, reduces cracking and restrains progressive breakage.

American Welded Wire Fabric is easily handled, quickly installed, lies flat and always stays in place during the construction operations. Engineers and contractors can tell you that with Welded Wire Fabric you actually use less steel, thereby reducing material and handling costs. That is why you will save construction time and money when you reinforce concrete with American Welded Wire Fabric.

As highway engineers plan for the future, the trend is toward wider traffic lanes, stronger reinforcement. The proven way to give these concrete roads of the future longer life is to reinforce them with welded wire fabric. And in the highway construction field, the majority of engineers and contractors safeguard their concrete work with American Welded Wire Fabric.

AMERICAN BRIDGE COMPANY · USS STEEL · UNITED STATES STEEL

United States Steel presents **THE THEATRE GUILD ON THE AIR** every Sunday evening. American Network (Blue).

American Steel & Wire Company

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*

United States Steel Export Company, New York

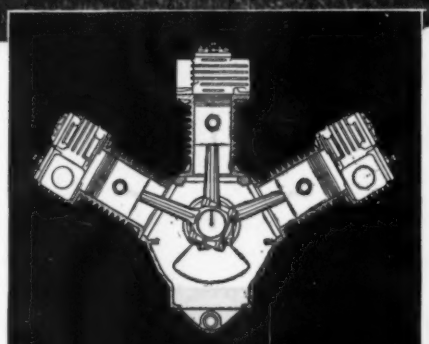
UNITED STATES STEEL

U·S·S American WELDED WIRE FABRIC

AIR PLUS JAEGER COMPRESSOR

Quiet Please!-Tobacco Asleep
25 Million pounds of finer, lighter, naturally milder
tobacco aging here for Lucky Strike cigarettes
JAEGER
ANTIC BITULITHIC CO. WASHINGTON
THIS QUIET
COMPRESSOR DOES ITS JOB AT

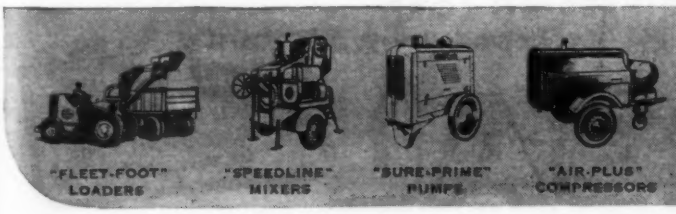
Because they are precision built and balanced, and develop full efficiency at slower piston speed, Jaeger "AIR PLUS" compressors are much quieter and cooler running, deliver more air per pound of fuel with less wear on engine and compressor. Fuel tank is recessed and protected inside the main frame, permitting use of 30% to 50% larger air receivers for less frequent engine acceleration, further fuel economy and cooling of the air . . . These are some of the reasons why compressor users are demanding "AIR PLUS." Ask for complete Catalog JC-5.



Compressor unit is a balanced "W" with interchangeable precision parts, micro-honed cylinders, force feed lubricated thruout.

THE JAEGER MACHINE CO., Columbus 16, Ohio

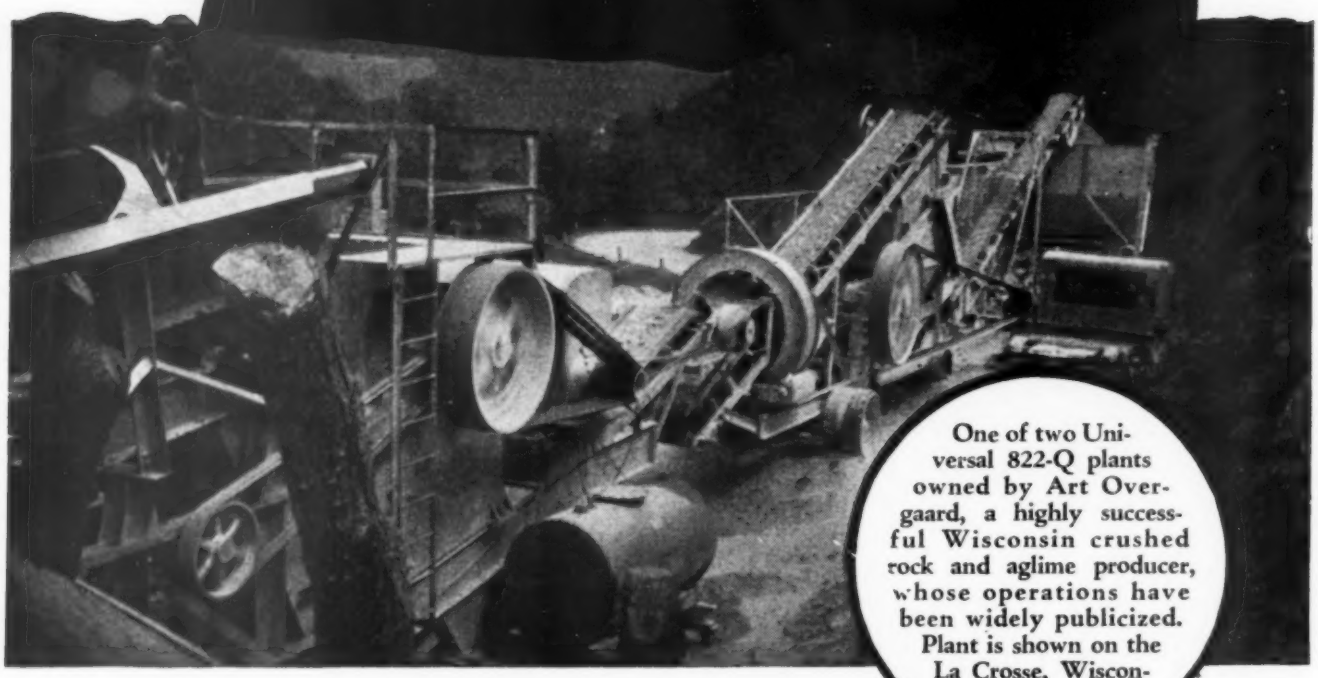
REGIONAL OFFICES:	8 E. 48th St. NEW YORK 17, N. Y.	226 N. LaSalle St. CHICAGO 1, ILL.	235-38 Martin Bldg. BIRMINGHAM 1, ALA.



JAEGER *Engineered* EQUIPMENT

JAEGER-LAKEWOOD SPREADERS, FINISHERS AND BITUMINOUS PAVERS, FORMS, FORM TAMPERS—"DUAL-MIX" TRUCK MIXERS, AGITATORS—JAEGER HOISTING ENGINES, TOWERS

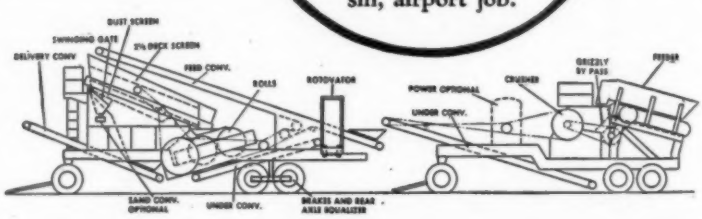
822-Q = { PORTABILITY + HIGH PRODUCTION



One of two Universal 822-Q plants owned by Art Overgaard, a highly successful Wisconsin crushed rock and aglime producer, whose operations have been widely publicized. Plant is shown on the La Crosse, Wisconsin, airport job.

Typical of the many profit-proved Universal portable crushing plants, is the 822-Q crushing, screening and loading plant. Primary reduction is by a Universal 546-P Unit which consists of rugged, steel plate hopper with built-in apron feeder, bar grizzly and by-pass, jaw crusher and underconveyor. Maximum capacity and minimum jaw wear is assured, as material not requiring crushing is short circuited.

Screening and secondary reduction is by the Universal 800 Secondary Unit. Material is fed to the 2½ deck gyrating screen, where larger oversize is scalped direct to rolls from top deck, protecting lower decks from excessive wear and assuring maximum screening efficiency. Material retained on lower deck also goes to rolls—throughs, to mixing hopper and delivery conveyor—dust is rejected by ½ deck. Material from roll crusher is returned to screen via Rotovator, closing circuit. A double deck auxiliary gyrating screen may be set in oversize Rotovator for production of 100% chips for seal coating, if desired.



PRIMARY UNIT SECONDARY UNIT

The Universal 822-Q Crushing and Screening Plant combines the high production of dual crusher units with extreme flexibility, in a compact, easy-to-move plant. Either unit can be used independently. The 800 Secondary Unit is adapted to use as a gravel plant.

This is part of the story—read the rest in Bulletin 30.

UNIVERSAL ENGINEERING CORP.
631 C Ave. W. Cedar Rapids, Iowa

UNIVERSAL

ROCK AND GRAVEL CRUSHERS, CRUSHING ROLLS, HAMMER MILLS, COMPLETE CRUSHING AND SCREENING PLANTS, WASHING PLANTS, ASPHALT PLANTS, SPREADERROLLERS.

How to Move MORE CUBIC YARDS

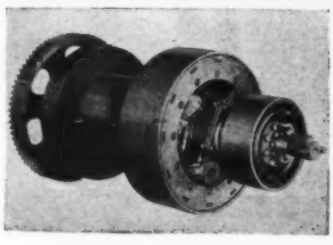
. . . at lower cost

Experience has proved that shovels, cranes, dredges and draglines equipped with Fawick Airflex Clutches give you new *full-time* operating efficiency.

1. These clutches absorb torque, shock and vibration, and transmit power through a cushion of air.
2. They have no arms, springs or levers to break, wear out or get out of adjustment.
3. They require no lubrication—maintenance costs are unusually low.
4. Their flexible cushioning action protects *both* motor and mechanism.

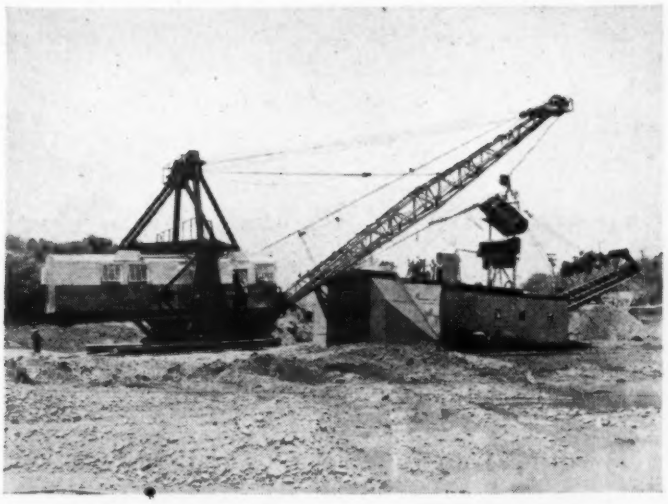
The RESULT—more hours of effective service—fewer breakdowns—more material moved—at lower cost per cubic yard.

Fawick Clutches are providing new efficiency for shovels, cranes, draglines and hoists.



▲ Seven Fawick Clutches are used on the Byers ½ cu. yd. "Traveler."

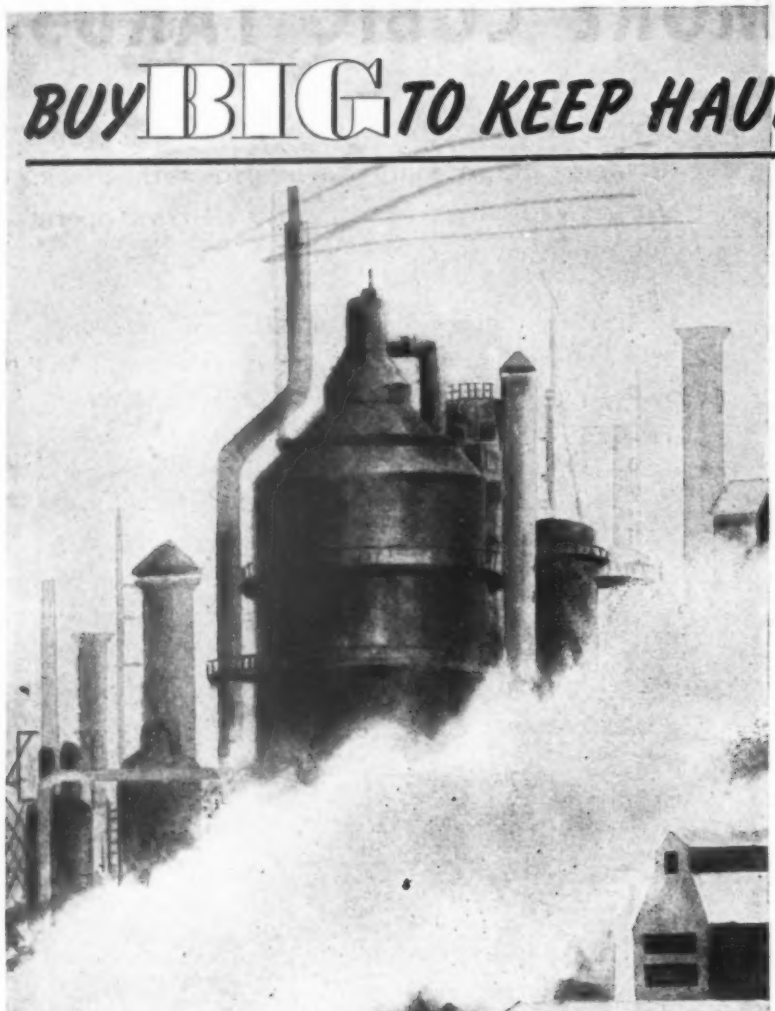
◀ Hoist drum assembly of the shovel above — Fawick equipped.



Marion dragline, equipped with Fawick Swing Clutches.

Write us for complete data, and recommendations engineered to suit your equipment. Book on request.

BUY BIG TO KEEP HAULING COSTS SMALL



Wherever the job permits a choice between the use of one heavy-duty truck and several smaller ones . . . pick the big fellow. Save on first cost, maintenance, payroll, and reinvestment when you trade in.

Ward LaFrance heavy-duty trucks set a completely new standard of dependability, and delivered power per rated horse power. They are the peacetime equivalent of the great Ward LaFrance-built Army wreckers which made motor truck history all over the world.

Every Ward LaFrance truck is a rugged truck . . . built *outsize* at the points where many trucks are likely to fail. For all heavy hauling operations on or off the road. Two, four or six-wheel drive.

If no dealer has been appointed in your community, write direct to Great American Industries, Inc., Ward LaFrance Truck Division, Elmira, New York.

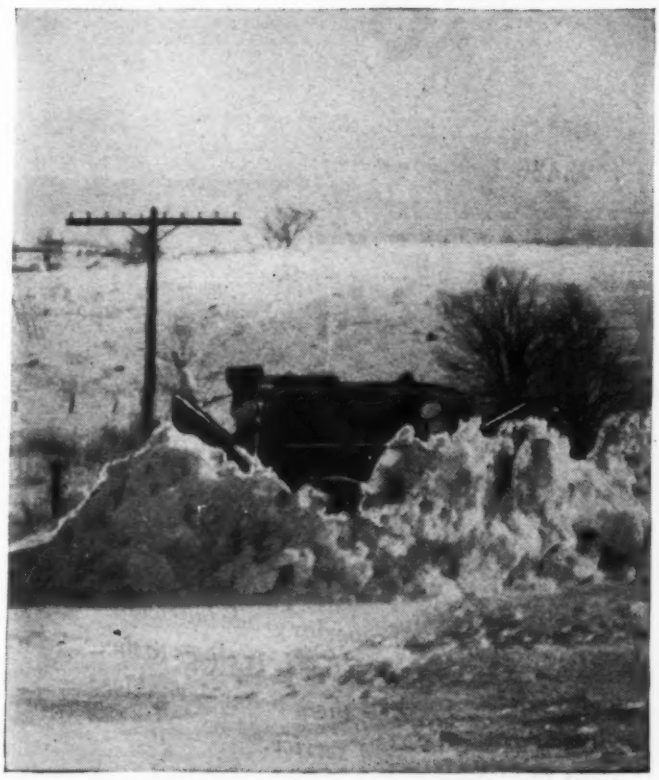
Valuable franchises are available in a number of high-potential areas.

WARD LAFRANCE

THE NEW STANDARD FOR HEAVY HAULING

FASTER
SNOW CLEARANCE!
&
FEWER
TRAFFIC TIE-UPS!

WALTER SNOW FIGHTERS



clear more miles per hour!

TAXPAYERS have a dollar-and-cents way of rating snow removal results. Snow-bound roads that tie up traffic cost time and money—far more than it costs to get adequate protection with Walter Snow Fighters!

Walter Snow Fighters do a faster, more thorough job—because they have the specialized power, traction and ruggedness to remove more snow per hour than any other equipment. Road-blocking drifts are speedily cleared. Snow is removed before it packs and freezes into dangerous ruts. Main highways are completely widened-out sooner, permitting more time to clear secondary roads.

The extraordinary tractive power provided by the exclusive Walter Four-Point Positive Drive is responsible for this performance. Full power is fed to FOUR driving wheels according to their traction at any instant. No power is wasted in slipping, stalling or wheel-spinning. Every bit of power is concentrated on a powerful, straight-ahead PUSH that throws snow far to the side. Write today for complete details.

WALTER MOTOR TRUCK COMPANY, 1001-19 Irving Ave., Ridgewood 27, Queens, L. I., N. Y.

WALTER
SNOW FIGHTERS

LAY·SET'S GREEN·LUBE

•GREEN-LUBE *is a superior grade lubricant made to our own specifications. It clings to the wires longer—protects them better—enables them to give increased service.*

ACCO

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma, Bridgeport, Co

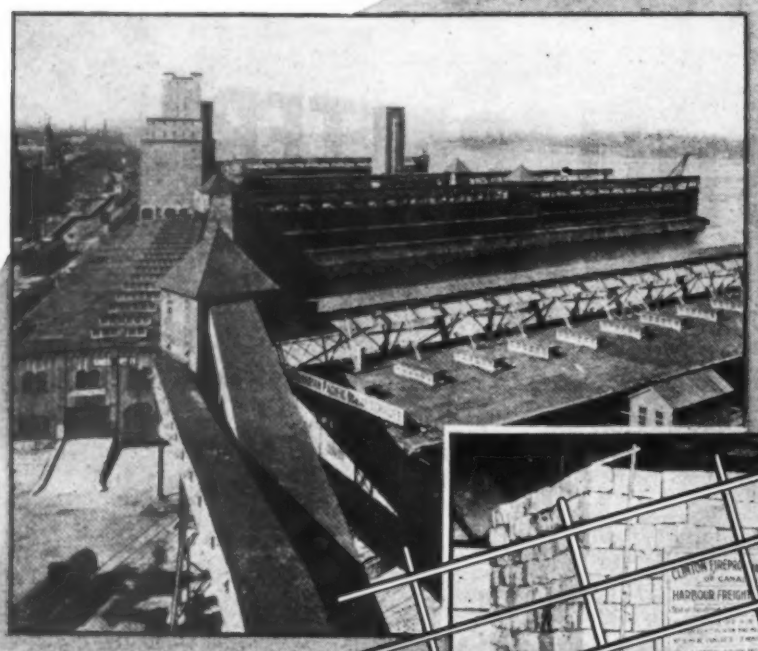
HAZARD WIRE ROPE DIVISION
AMERICAN CHAIN & CABLE

ACCO
TRADE MARK

In Business for Your Safety

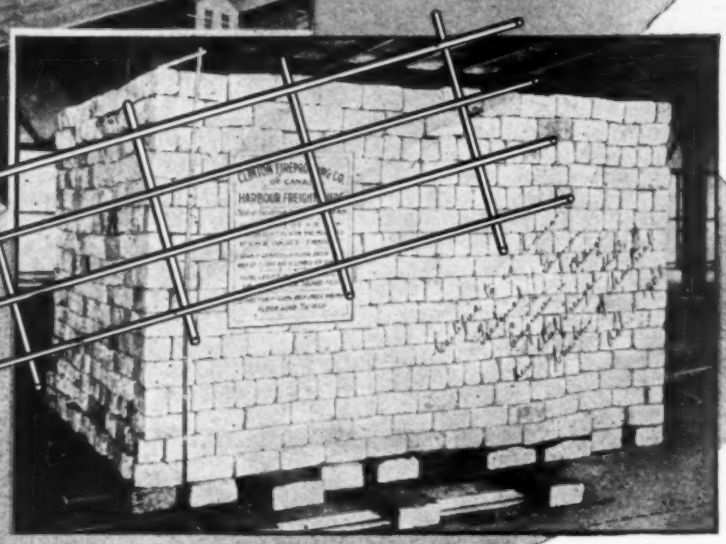
MAKES IT STILL BETTER

HAZARD'S All-Green rope is LAY-SET Preformed made of Improved Plow Steel — the best rope. Now this rope is *still better,* because it is completely protected with GREEN-LUBE *Every strand* is packed with our new superior green lubricant which gives added life to every wire. Not a single strand, not two strands, but every strand—yes, even every individual wire is completely covered by GREEN-LUBE The all-green color is an added protection to the highest grade rope made: LAY-SET Preformed I. P. S. Use only Hazard's All-Green rope.



The Harbor Freight Sheds at Montreal are of steel with floors and roofs of reinforced concrete.

In a test of the floor arches, made at age of 2 months, a 5" slab of 1-2-4 concrete 7 ft. wide reinforced with Clinton Fabric 4" x 12" mesh, Nos. 3 and 8 wire, was subjected to a load of 1650 lbs. per sq. ft. over an area of 24 feet. Deflection under this load was only 1/16 inch.



HARBOR IN THE HEART OF A CONTINENT

Situated a thousand miles from the ocean, the Harbor of Montreal, Canada, is the second port of North America. The Freight Sheds, which are capable of handling about 300,000 tons of cargo weekly, were built in 1908, and a total of 2,300,000 square feet of Clinton Electrically Welded Fabric was used for concrete reinforcement.

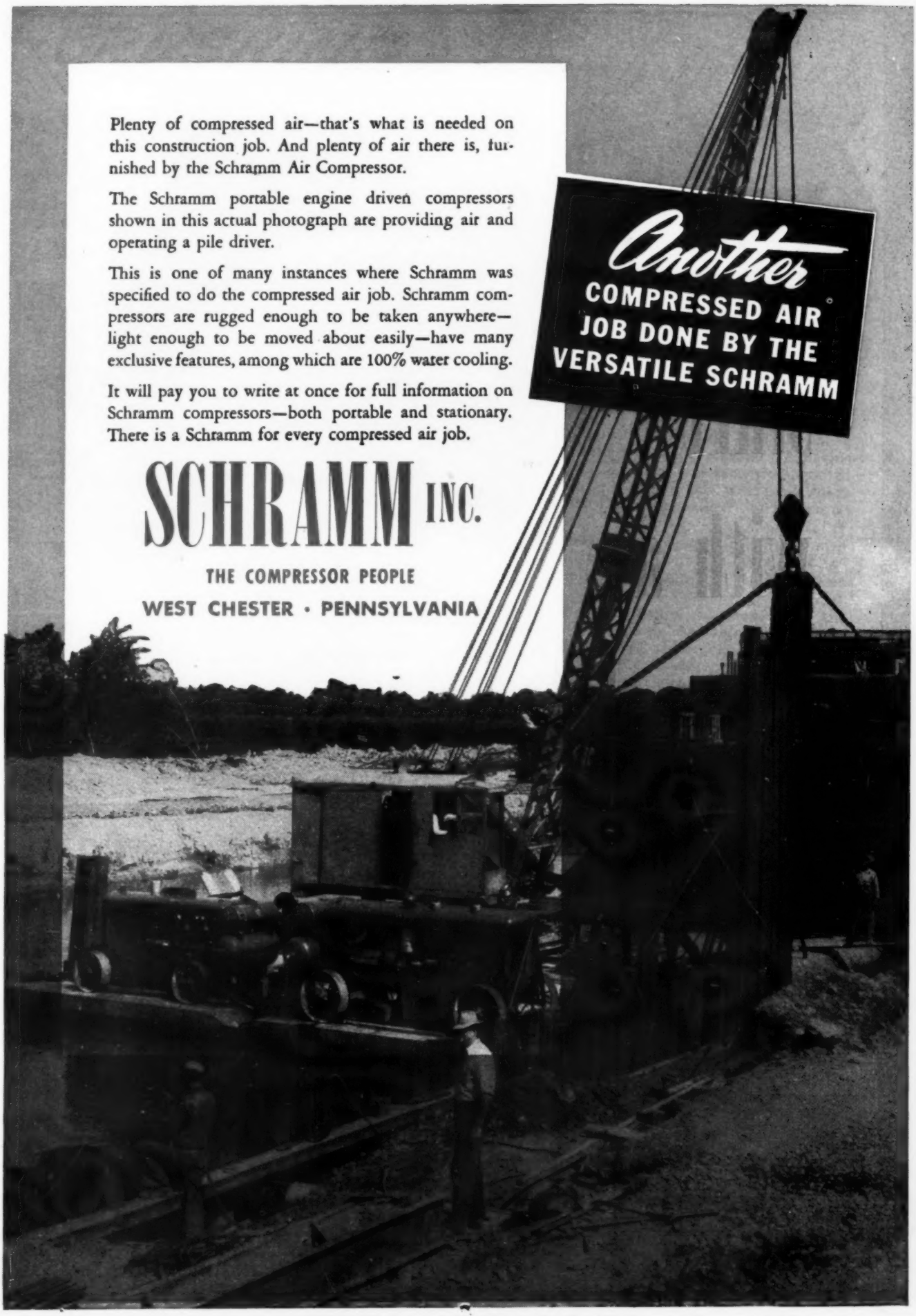
The test illustrated above, and scores like it in various types of structures, is indicative of the uniform, high tensile strength of Clinton Welded Fabric. More important is the fact that for over 35 years the Montreal Freight Sheds have withstood, not only the tremendous volume of freight handling, but sub-zero temperatures that necessitate closing of navigation for four months each winter.

Clinton Welded Fabric has been used in practically every type of reinforced concrete construction and today—43 years since its invention—it is still a leader in the field. It is supplied in rolls or sheets made and cut to specification for easy storage, handling and installation. For complete details write Structural Products Division, Wickwire Spencer Steel Co., 14 Lafayette Square, Buffalo 3, N. Y., or our nearest branch office.

WICKWIRE SPENCER STEEL COMPANY

500 FIFTH AVENUE, NEW YORK (18), N. Y.

ABILENE (TEX.) • BOSTON • BUFFALO • CHATTANOOGA • CHICAGO • CLINTON (MASS.) • DETROIT • HOUSTON • LOS ANGELES PHILADELPHIA • SAN FRANCISCO • TULSA • WORCESTER



Plenty of compressed air—that's what is needed on this construction job. And plenty of air there is, furnished by the Schramm Air Compressor.

The Schramm portable engine driven compressors shown in this actual photograph are providing air and operating a pile driver.

This is one of many instances where Schramm was specified to do the compressed air job. Schramm compressors are rugged enough to be taken anywhere—light enough to be moved about easily—have many exclusive features, among which are 100% water cooling.

It will pay you to write at once for full information on Schramm compressors—both portable and stationary. There is a Schramm for every compressed air job.

SCHRAMM INC.

THE COMPRESSOR PEOPLE

WEST CHESTER • PENNSYLVANIA

Let's start with a clean slate

FOR FOUR LONG YEARS we have waited for this day when we could "wipe the slate clean" of our war-born difficulties in serving you. We express sincere appreciation for the co-operation and understanding you have shown when shipments were delayed, when tank cars were unavailable and when asphalt stocks were depleted. Although these difficulties grew out of the war, we were constantly aware of how they disrupted your plans and operations.

We hope you remember our service under normal conditions. Let us now show you how our strategically located refineries, and the on-the-job cooperation of our local representatives, provide unsurpassed assistance in supplying your asphalt needs. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

Buy and hold more Victory Bonds

STANDARD OIL
asphalt

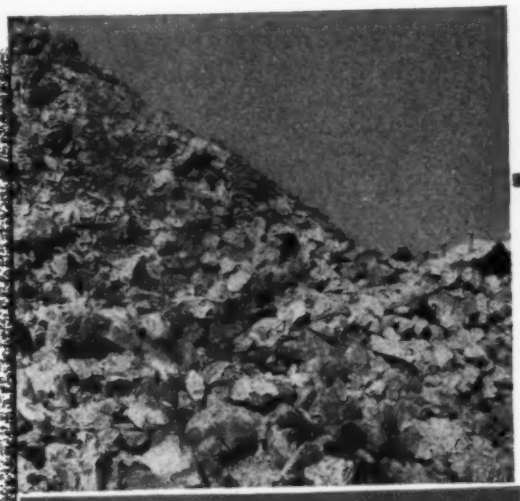
STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

★ LUBRICATION ENGINEERING

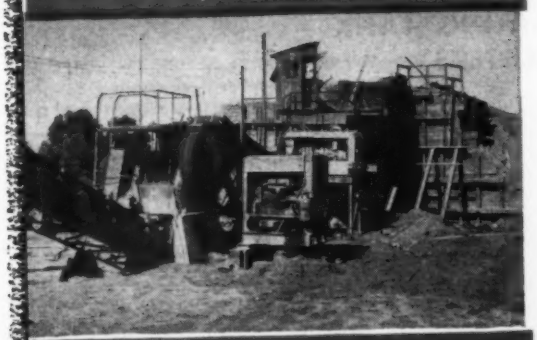
CRUSHING FLINTROCK

ONE OF THE HARDEST AND MOST ABRASIVE ROCKS IN THE WORLD

with PIONEER EQUIPMENT



Flintrock boulders, near Joplin, Mo. equalled in abrasiveness by only one known South African rock deposit.



Pioneer Plant owned by Harold Youngman of Baxter Springs, Kansas.

Pioneer No. 56 Primary Crusher consisting of a Grizzly Feeder and 2436 Primary Jaw Crusher.

●This is one of those interesting jobs that men who make their living in pit and quarry enjoy reading. It begins with the Santa Fe railroad which has recently installed new high-speed trains on its main line west of Kansas City. It was found that limestone ballast did not stand up under severe service.

Chats, which are rejects from lead and zinc mines near Joplin, Mo., were available, but their size was minus 3/8" and too fine for ballasting the main line for high-speed trains.

Also available were great piles of flintrock which the mine operators had rejected as uncrushable. The mining section of W.P.B. advised that this rock was the most abrasive known in the U. S. and equalled only by one known rock deposit in the world located in South Africa.

Harold Youngman of Baxter Springs, Kansas, took the contract to crush this flintrock to 1½" minus. The following PIONEER equipment is doing the job:

- a PIONEER No. 56 Primary Crusher, which consists of a Grizzly feeder and a 2436 Primary Jaw Crusher
- a PIONEER 1536 intermediate jaw crusher
- a PIONEER 48-V plant which includes a 1036 jaw crusher, a 40" x 22" roll crusher and a 4' x 12' vibrator screen.

Because of the extreme abrasiveness of the rock, it was found that better results could be obtained by using the four crushers and closing down the top opening on the jaw crushers, thus reducing the angle between the jaws and increasing the manganese life several times.

PUT IT UP TO PIONEER

You may never have a job like Mr. Youngman's, but whatever your job you'll want Pioneer equipment—the dependable equipment built with extra margins of performance for extra profits.

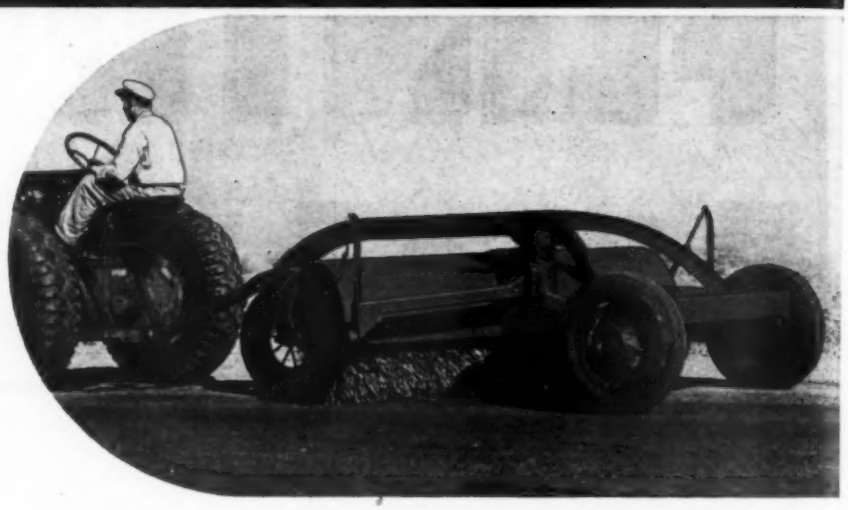
Pioneer
ENGINEERING WORKS
Jaw Crushers • Roll Crushers • Screens • Conveyors • Feeders • Washers

ENGINEERS and MANUFACTURERS of QUARRY-GRAVEL AND MINING MACHINERY

MINNEAPOLIS 13, MINN

DO IT BETTER WITH GRACE

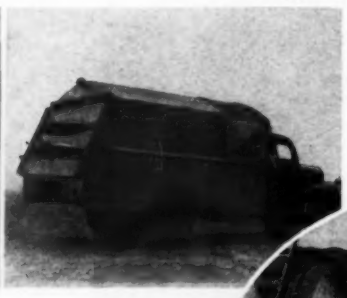
Grace equipment is built upon engineering principles to DO YOUR JOB BETTER. Expert craftsmanship plus long years of practical experience go into every Grace machine . . . giving you better equipment to do your job *economically, efficiently,* and *quickly.* Do it BETTER with GRACE equipment!

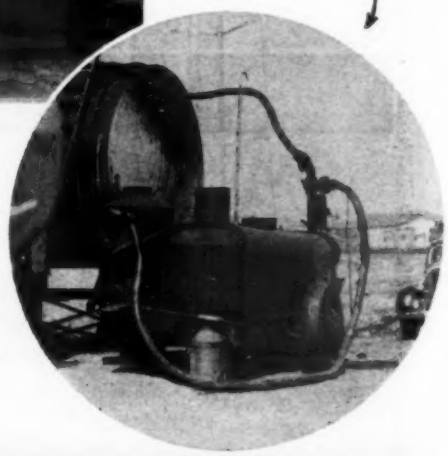


SWEEPERS . . . with extra long-life bristles, are ready to go to work for you . . . cleaning road base prior to applying asphalt, sweeping streets, or for airfield work. Available in axle driven (shown above), motor driven, or for front end of tractor types.

FRONT END OF TRACTOR TYPE GRACE SWEEPER . . . sweeps either right or left. Has a minimum of working parts. Does not tie up side or rear power take-off of tractor.

CIRCULATING TANK CAR HEATERS . . . the quickest way to heat the coldest car of asphalt. With flues specially designed to heat and load any type asphalt from tank cars at pumping rates up to 250 GPM. Grace Circulating Tank Car Heaters do a better job. Temperatures up to 450° reached and held quickly and efficiently.





PNEUMATIC ROLLERS (above left) . . . with 10 tires, oscillating axles, large body. Plenty of room for ballast, keeps load close to ground, eliminates tipping.

GARBAGE BODIES . . . large capacity with few working parts. Bulky materials compressed to give maximum payload. No-drip bottom . . . sanitary.

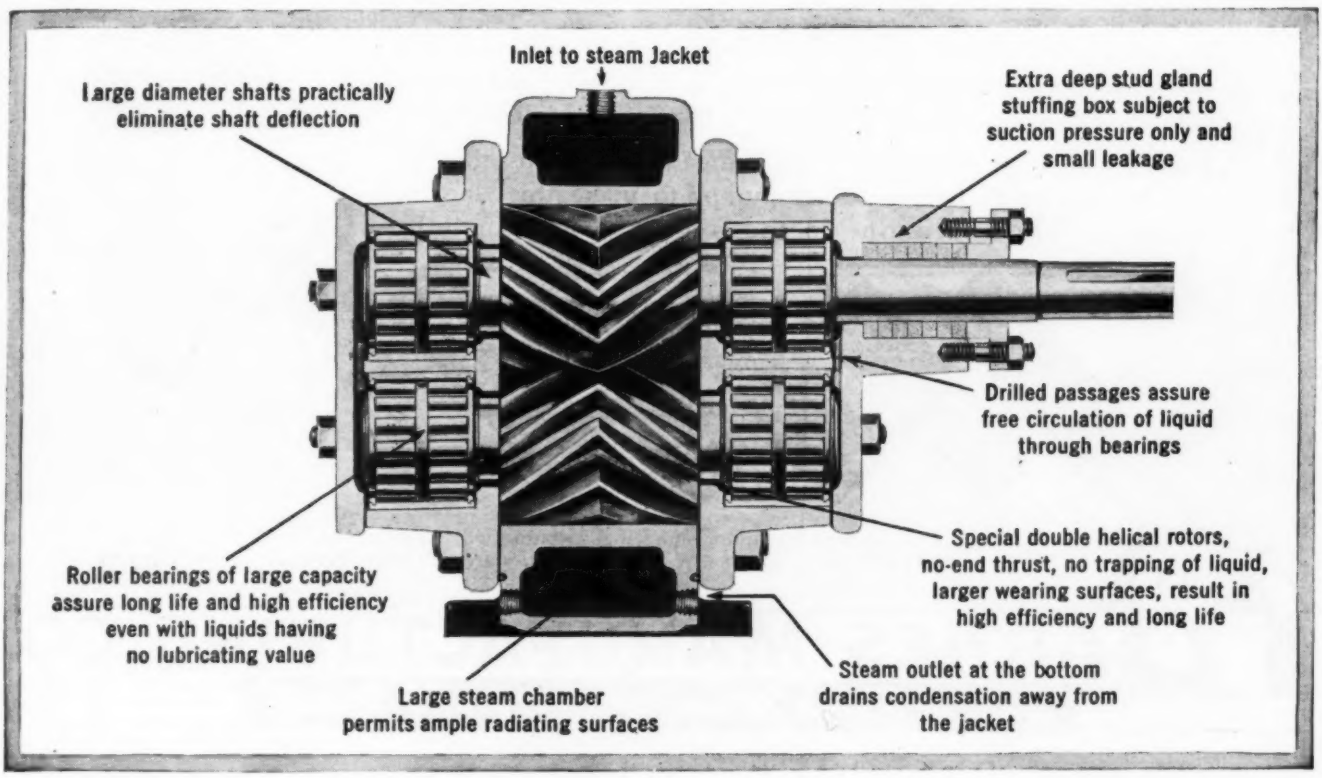
Write Today For Full Details

Prompt Shipment

W. E. GRACE MANUFACTURING COMPANY

6005 S. LAMAR STREET — DALLAS, TEXAS

HOW TO HANDLE ASPHALT WITHOUT GETTING "STUCK"


Inlet to steam Jacket
Large diameter shafts practically eliminate shaft deflection
Extra deep stud gland stuffing box subject to suction pressure only and small leakage
Drilled passages assure free circulation of liquid through bearings
Special double helical rotors, no-end thrust, no trapping of liquid, larger wearing surfaces, result in high efficiency and long life
Roller bearings of large capacity assure long life and high efficiency even with liquids having no lubricating value
Steam outlet at the bottom drains condensation away from the jacket
Large steam chamber permits ample radiating surfaces

Specify Worthington GRJ Steam-Jacketed Rotary Pumps

Trouble-free handling is what you want in the pump you depend on for putting asphalt where you want it when you want it.

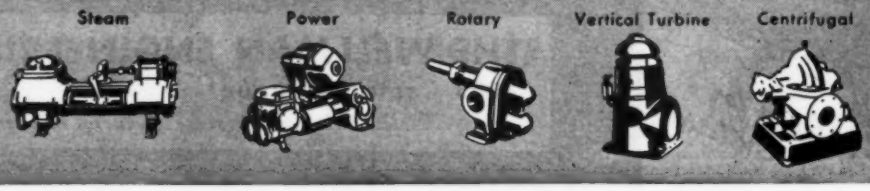
Fortunately, you can get dependability in a Worthington GRJ Steam-Jacketed Rotary Pump. The cross-sectional picture above shows you why. One thing the picture doesn't show, however, is the short starting time which results from the large radiating surfaces of the Worthington heating jacket. That means less time lost by equipment and men waiting for asphalt to flow.

Your nearby Worthington Representative can give you other valuable facts about Worthington GRJ Rotary Pumps. In the meanwhile, you can prove that *there's more worth in Worthington* by writing for Bulletin W487-B11. *Worthington Pump and Machinery Corporation, Harrison, New Jersey.*

WORTHINGTON

PS-11

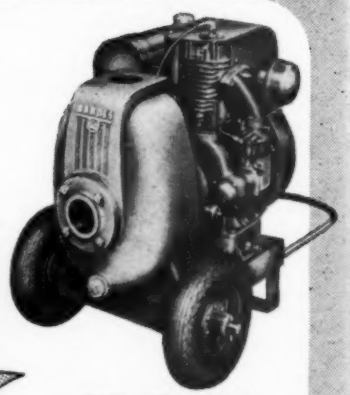
THE WORLD'S LARGEST MANUFACTURER OF PUMPS



BARNES OFFERS DOUBLE-BARRELED PROFIT POSSIBILITIES FOR PUMP DISTRIBUTORS

Barnes is out in front again. First, Barnes announced a newly designed line of automatic centrifugal pumps with stepped-up capacities which are now displayed by Barnes distributors.

Barnes offers an array of hard-hitting selling helps that go side by side with Barnes better pumps to make this line the fastest selling, profit line in the country. These include:



THE ACE (20M)
Complete line with capacities from 3000 GPH to 90,000 GPH.

GOLDEN JUBILEE 1895 1945 50 Years of Progress

1 Personal Field Service and Sales Training.

2 Twin-purpose advertising in leading national and sectional publications.

3 Catalogs in full colors—Complete service of advertising and promotional literature.

4 Instruction and Service Manuals for every pump.

5 Sales strategy for distributors built upon tested and proved merchandising practice

The far-sighted and profit-minded distributor will want to handle the Barnes line. A number of choice territories are still open. Write, phone, or wire.

ARMY E NAVY

BARNES MANUFACTURING CO.

Quality Pump Manufacturers for 50 Years — MANSFIELD, OHIO

Send for Bulletin

WELLMAN *Williams* BUCKETS

PERFORM BETTER *Longer*

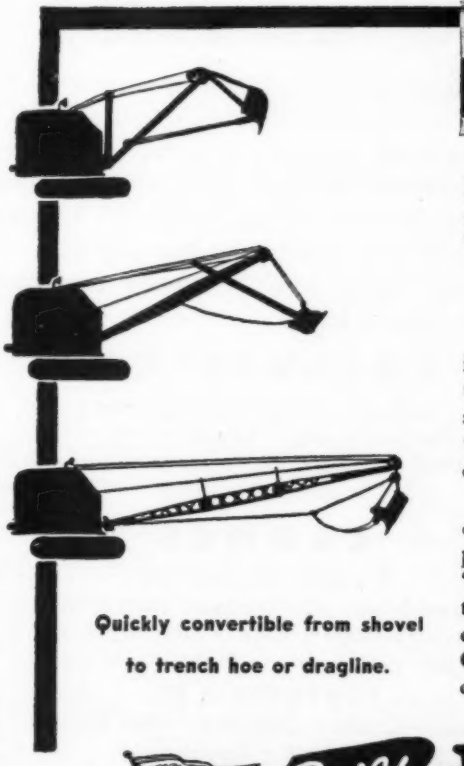
Multiple Rope and Power Arm Types · Dragline · Power Wheel · Special Service Buckets · ⅛ to 16½ yd. capacities.

WELDED ROLLED STEEL CONSTRUCTION FOR LOWER MAINTENANCE, LONGER LIFE . . .

Formerly featured only in Wellman custom-built buckets — now in *every* Wellman-Williams Bucket.

THE WELLMAN ENGINEERING COMPANY
7003 Central Avenue • Cleveland 4, Ohio
Sales and Service Agencies in Principal Cities

RUGGED FROM THE GROUND UP!



Quickly convertible from shovel to trench hoe or dragline.

Here's the truck and crawler assembly of a Buckeye Clipper. Its rugged construction—simple design—assures a far greater service life—less time out for repairs.

BIG — treads are 22 inches wide with 9 inch pitch!

STRONG — both treads and sprockets are of heat-treated, alloy steel!

The crawler assembly — built in its entirety in the Buckeye shops — is typical of the superior design and construction found throughout the Clipper. Crawler is the well-known Buckeye patent, non-clogging, self-cleaning type. Tapered roller path below swing gear supports weight of machinery deck — stress and side play are removed from center pin.

Added to the inbuilt qualities of stamina, high productivity and low cost operation is the exclusive "Mevac" system — metered vacuum power control — similar to that used for years on big highway trucks. "Mevac" reduces operator fatigue to a minimum — all shovel functions respond to a flick of the operator's wrist on the short "Mevac" control handles. Send for 24-page illustrated booklet, "The Age of the Clippers," and learn how these easy-to-operate ½ and ¾ yard shovels can help you cut costs in your postwar operations.

Built by Buckeye

Buckeye Traction Ditcher Co., Findlay, Ohio

Convertible Shovels

Trenchers

Tractor Equipment

Road Wideners

R-B Finegraders

Spreaders

A GROUP OF SIGNS BUT OVERALL REFLECTORIZING WITH *Scotchlite* makes ONE STAND OUT

"SCOTCHLITE" BY DAY

"SCOTCHLITE" BY NIGHT

Signs reflectorized with "SCOTCHLITE" place traffic on the alert.

On city streets or on country highways, "SCOTCHLITE'S" clear readability attracts immediate attention. Overall reflectorizing *every* type warning sign with "SCOTCHLITE" helps reduce accidents—*day* or *night*.

The greater visibility produced by overall reflectorizing traffic signs and the fact that the same shape and color are retained day or night are outstanding safety features in meeting ever-increasing high speed driving conditions.

"SCOTCHLITE" is a weather-tested, proven product that can be applied to any type sign. Its economy through continuous use makes "SCOTCHLITE" an important factor to all Traffic Engineers who are planning better safety programs.

"SCOTCHLITE" is available in easy-to-handle roll form in colors of silver, white, yellow and red that can be applied to new or old signs. Ready-made signs can also be purchased for immediate installation.

3-M MANUFACTURERS PRODUCTS

MINNESOTA MINING AND MANUFACTURING CO.
GENERAL OFFICES: SAINT PAUL 6, MINN.
BRANCHES IN PRINCIPAL CITIES

HANSON

Crawler

EXCAVATORS and CRANES

With Hanson Crawler Excavators and Cranes you can hoist, propel, swing and steer, all at the same time. This is the exclusive Hanson feature which enables so many engineers and contractors to add that extra bit of speed *and profit* that makes the job pay out.

Put this "extra profit" Hanson feature to work on your jobs.

EXCAVATORS

3/8 and 1/2 Cu. Yd. Capacity
Full revolving — Chain crowd —
Welded steel construction — Low center of gravity.
Gasoline or diesel.

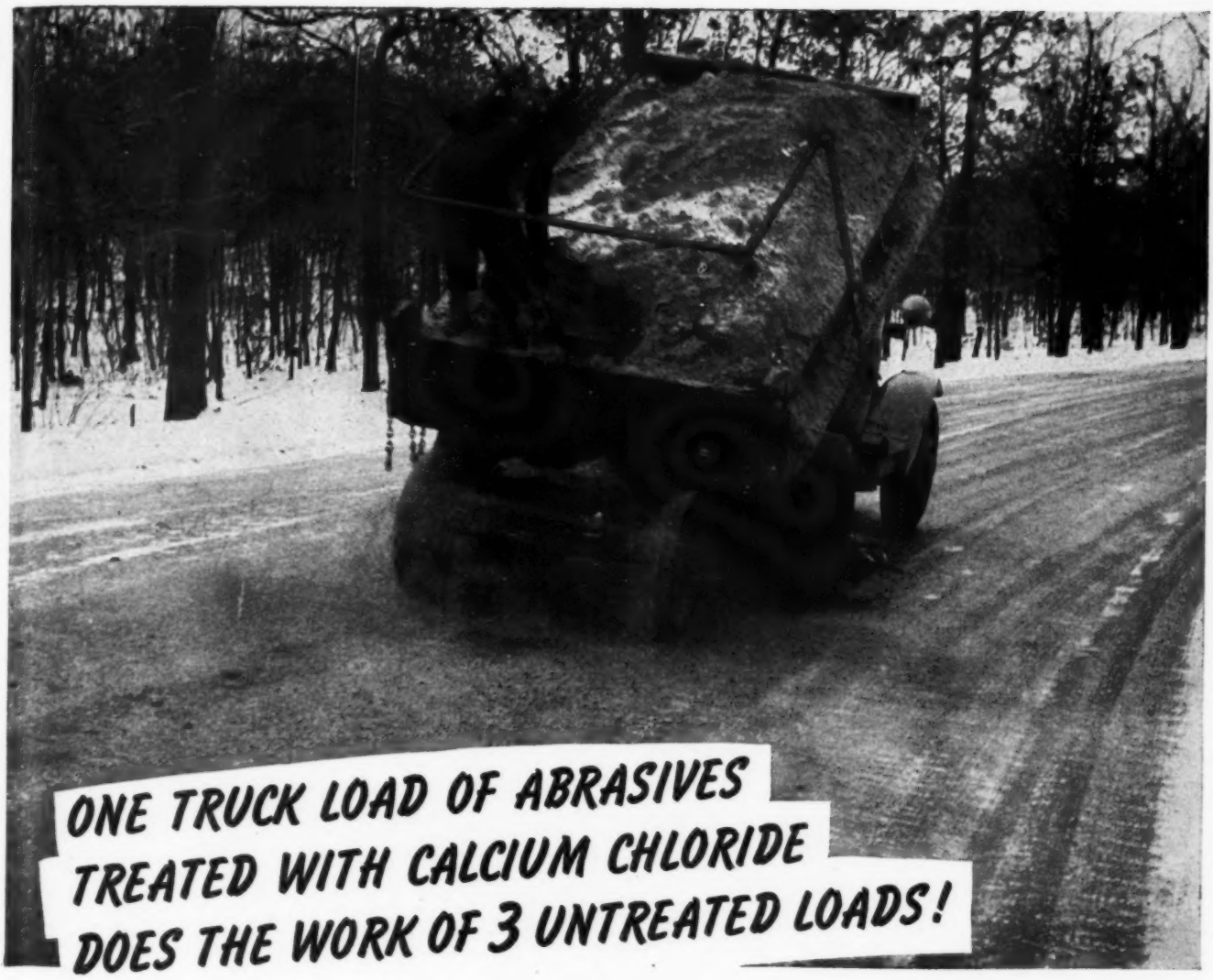
CRANES

4 and 6 Ton Capacity
Full revolving — Lattice type steel boom —
Balanced design — Low center of gravity —
Rugged — Versatile — Gasoline or diesel

CONVERTIBLE TO:
Shovel — Crane — Dragline — Pile Driver — Clamshell — Trench Hoe

Complete details in folder EC45. Write for it.

THE HANSON CLUTCH & MACHINERY CO.
TIFFIN, OHIO



Trucks are scarce these days. Don't use three when one can do the work. You can save two-thirds of war-scant supplies of gas and tires.

One crew can accomplish the same amount of skidproofing as three, if the abrasives used are treated with calcium chloride.

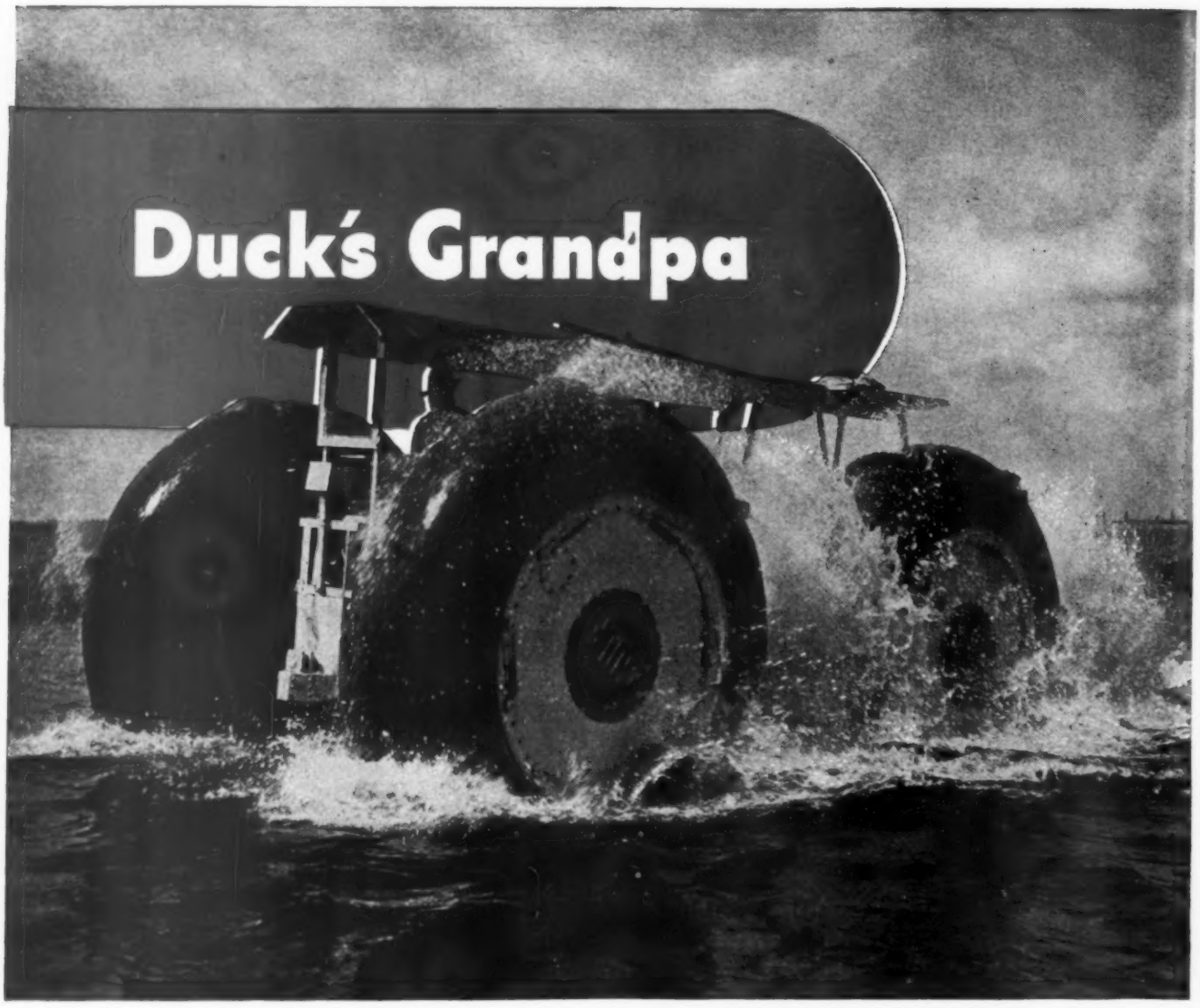
Automobile skid tests made under impartial supervision show that ½ lb. of abrasives treated with calcium chloride is as effective as 1½ lbs. of untreated abrasives. Even in zero weather, the treated abrasives melt into ice quickly. They stay anchored in the ice . . . provide a sandpaper-like surface that gears the tires to the road.

Save trucks, tires, gasoline, manpower. Save two-thirds the cost of getting out your abrasives. Protect and hasten traffic by treating ice control abrasives with calcium chloride. Write for bulletin No. 27, "Skidproofing Icy Roads and Streets."

CALCIUM CHLORIDE ASSOCIATION, 4145 Penobscot Bldg., Detroit 26, Mich.

ICE CONTROL WITH
CALCIUM CHLORIDE
FAST • POSITIVE • ECONOMICAL

Gears Icy Roads to Tires



MEET the grandfather of today's "Ducks," "Weasels" and other amphibious military vehicles—born 10 years ago when Gulf Oil Corporation geophysicists decided to search for oil deposits in Florida and Louisiana swamps.

To get men and test instruments into that soft, gooey marshland, Gulf engineers, with Goodyear development men assisting on the tire-and-wheel plans, designed the vehicle you see above — a self-powered "marsh buggy" shod with big Goodyear balloon tires cross-strapped with lengths of hose that act as traction chains in mud, as paddles in water.

These big Goodyears support and move full loads over dry land and marshland — keep the buggy from sinking into mud and ooze. Equally important, they're sized and calculated for full flotation. More than 3 times larger than car tires, but carrying only 1/10 the air pressure, these big babies are motive water wings, too—buoyant enough to float the buggy and its load when deep water is encountered.

This example of job-engineering adds further proof of Goodyear's ability to build the right tire for any job. For construction work, Goodyear off-the-road tires are designed and built to meet the needs of special operations — the great Sure-Grip for drive wheels, the super-tough Hard Rock Lug for rock work, and the time-proved All-Weather Earth-Mover for general purpose vehicles.

And because these 3 big Goodyears deliver top performance and lower costs-per-ton-mile, they're first choice with cost-wise contractors everywhere. Why not buy — and specify — Goodyears on *your* units?

GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

Sure-Grip, All-Weather—T. M.'s The Goodyear Tire & Rubber Company

ROADS AND STREETS

DECEMBER, 1945 • VOL. 88. • No. 12

Hoosier Concrete Job Spotlights New

Air Entrainment Specifications

★ Note the freedom from "leakage" of concrete made with air entraining cement

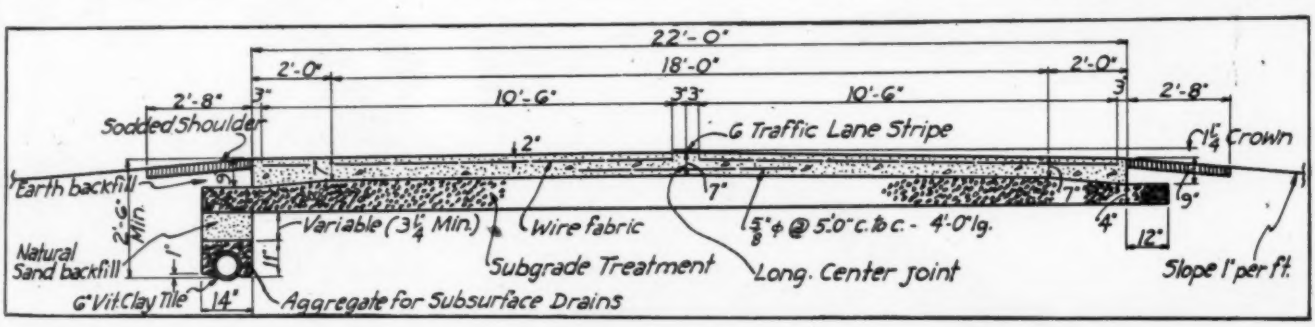
New postwar 34-E dual paver model gets workout on project also marked by employment of latest field test for entrained air; part of old concrete salvaged by recapping

THE sidewalk superintendents were numerous on Moellering Construction Company's concrete road job near Ft. Wayne this past autumn. Their 6-mile reconstruction project on route 24 was one of two sizable Indiana paving contracts let for late 1945 completion. Both employed air entraining concrete. This job, in addition, served as a first try-out for the state's new 3%-5% air limit specifications, and for the entrained air field test procedure described and pictured later on in this article. Also, serving to draw visits from contractors as well as engineers, a new 34-E dual drum paver was given a "pilot" run here by the Foote Company.

As to the project itself, it consisted of 2-lane reconstruction to modern line and grade. The 22-ft. concrete pavement consisted of a 9-7-7-9 wire-mesh-reinforced slab placed on a sand base. No expansion joints were employed. Doweled contraction or dummy joints were spaced every 40 ft. and sealed with poured rubber compound. Subgrade was rolled to 95% compaction under new pavement.

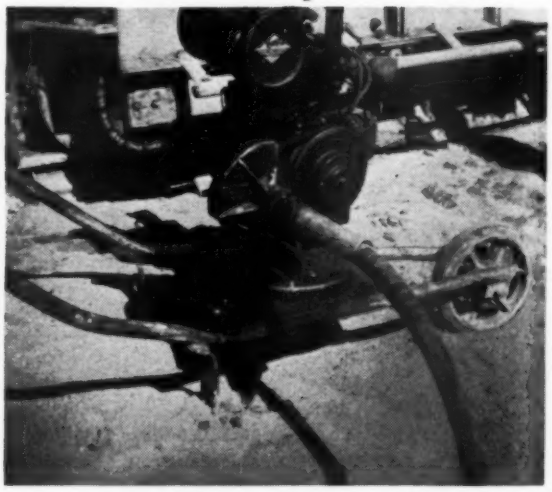
The sand base was placed to a somewhat novel trapezoidal cross-section, formed by blading the subgrade with a transverse slope of ⅛ in. per ft. This slope gave a graduated transverse slope depth of sand ranging from 4 in. under one edge of the pavement to 7 in. under the other. The sand section extends part way into the shoulder on either side. Drainage is provided by a line of 6-in. tile along the lower side. This base design permitted construction of new pavement at little or no change of grade from the old, without necessity of complete removal of shoulders.

Much of the old concrete pavement, placed in 1926, proved to have ex-



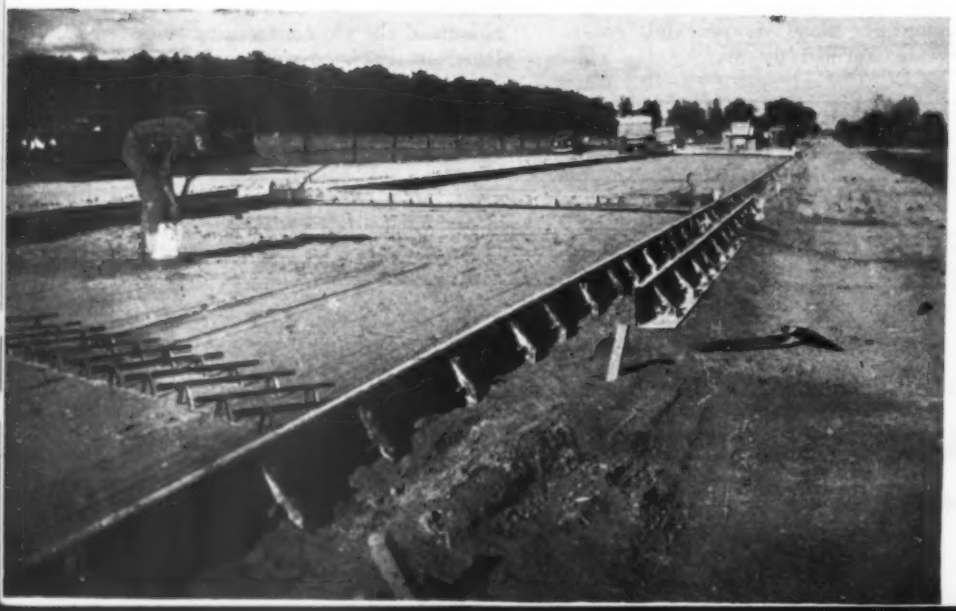
★ Longitudinal power float on this job.

★ Belting was done thusly, with one man instead of two



★ After spreading top lift, concrete was vibrated at longitudinal dummy joints by making two passes with this vibratory float, designed to straddle the joint plate

★ A supplementary line of forms on either side, as used along 50-ft. transition between tangent and superelevated curve. (Extra wide-base forms used)



★ (Left): Henry J. Moellering, of Moellering Const. Co. (Right): Project engineer Charles Hensler, and Ray Kennedy, factory man from the Foote Co.

cellent structural value as a base. Where grade and line considerations permitted (about 2 miles) the new 22-ft. pavement was designed as a recap, enveloping the old 18-ft. slab with a 5 to 6-in. second story and a 9-in. thick overhang on either side. The old pavement was covered with subgrade paper before placing new concrete, to insure structural separation.

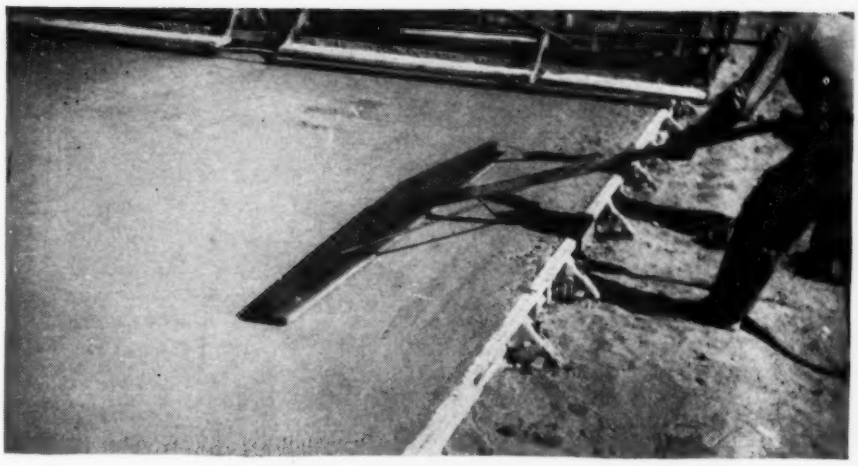
Subgrade under the "overhang" portion was rolled to 100% compaction and the "overhang" was reinforced by 3½ ft. x ½-in. round transverse bars spaced every 2 ft. along either side. The bars were dropped into place by hand after striking off the concrete 3 ft. below the finished surface, and before placement of wire mesh.

Old pavement not salvaged was broken up by skullcracker mounted on a truck crane, bulldozed into piles and picked up by a dragline.

The concrete paving work was slowed by weather delays, poor labor and a shortage of trucks, in spite of a modern outfit which probably could have broken speed records under better conditions. Equipment included mechanical ditcher or edge drains; two motor graders for spreading and sand base; extra-wide-base forms designed for sand; and a tractor-drawn fine grader. Behind the spreader and finisher there was a longitudinal power float, a strip machine for center and cross dummy joints, and a bridge for placing the iron oxide center stripe (which by the way was made 6 in. wide instead of 4-in. width heretofore employed in Indiana).

Concrete was vibrated only at doweled joints, using a wooden vibratory float which was dragged once across the freshly struck-off concrete and back just in front of the finisher.

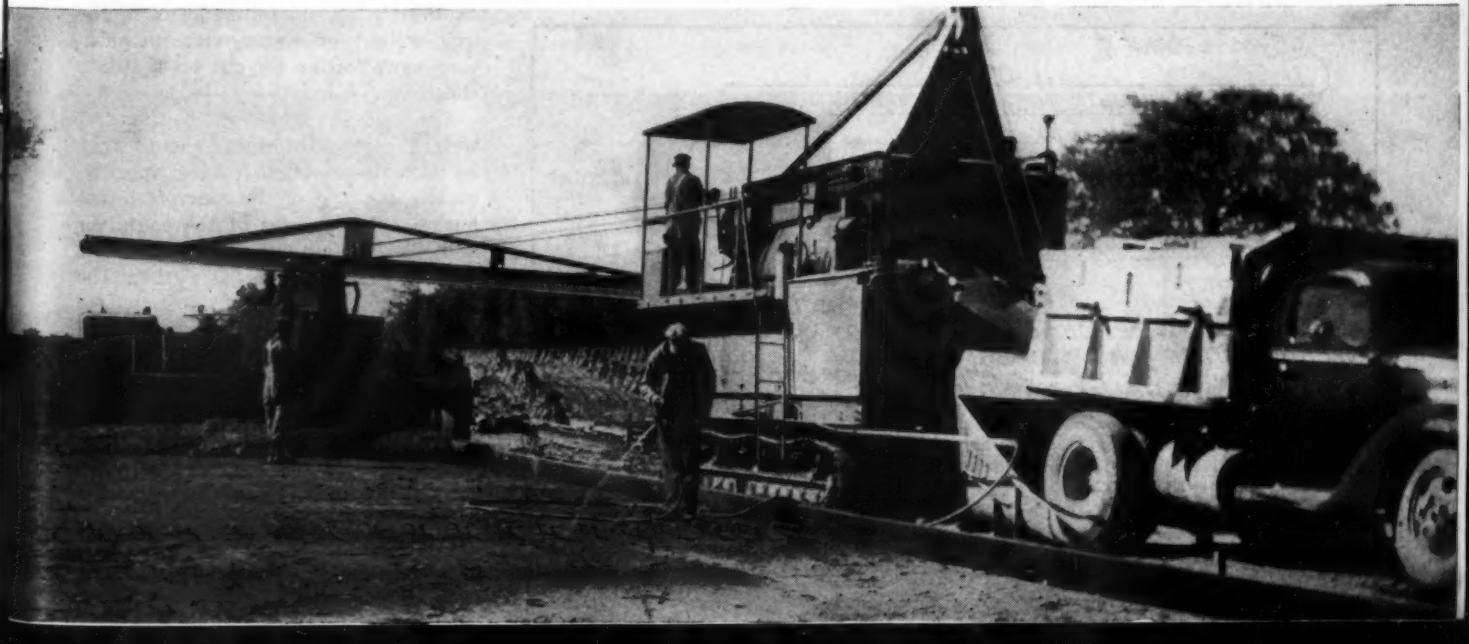
The new 34-E dual drum paver was obviously a "smoothie" although the manufacturer wasn't in a hurry to give out many details. During steady runs when plenty of batch trucks were coming up this fully automatic machine clocked a 10% oversize batch (37.4 cu. ft.) every 35 seconds. Runs of 60 batches an hour including all momentary delays were common, and 70 to 80 batches an hour were an occasional peak. The theoretical maximum output was reduced here by the necessity of shuttling the paver back for placing the 3-in. top lift after setting reinforcement. High mobility is claimed for this unit, as well as labor and time saving mechanical features.



★ Finishers worked a pair of long handled floats. Clean, dry forms emphasize how air entraining concrete has eliminated the surface "soup" so detrimental to good wearing quality

★ The spreader which eliminated practically all hand labor of spreading

★ "Showpiece" on the Moellering job was a "pilot model" of a 34-E dual drum paver soon to be put on the market



★ Dowel assemblies for dummy cross joints were held in place by shovelfuls of concrete

★ A 37.4 cu. ft. batch every 35 seconds is "pie" for this machine, 'tis said, although truck shortages and bad weather slowed the job

Indiana "Air" Test

Field test for checking entrained air in freshly placed concrete, as adopted during 1945 by the Indiana state highway commission to expedite field control routine in connection with new "3% - 5%" air specifications

This test is made to determine the quantity of trapped air (per cent of voids) in freshly produced concrete manufactured with the use of an air-entraining portland cement. A report of such determination, using a prescribed form (Indiana No. I. T. 595B, shown herewith) shall accompany each yield test report on all road construction contracts when air-entraining cement is used.

Method of Making Test

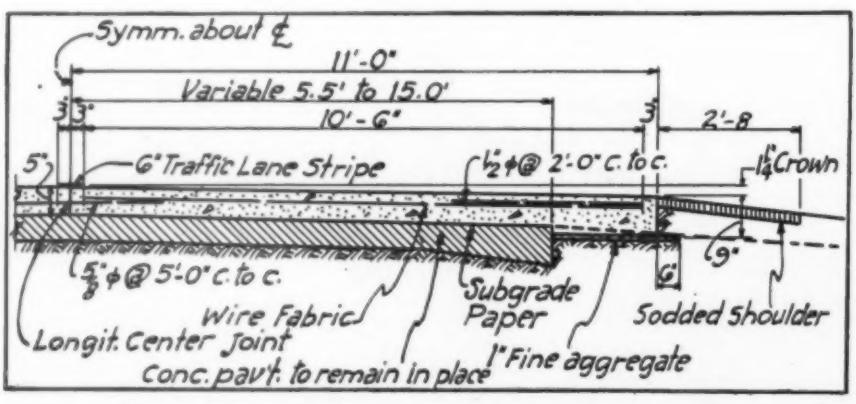
The equipment is the same as that used for making the Yield Test, with the addition of a water pail, small tin can, and a hook gauge.

Determine the weight of a cubic foot of concrete "A" by weighing the nominal 0.5 cu. ft. measure of concrete, filled in the manner set out for making the standard Yield Test; or the weight of the third bucket may be used when this Air Content test is being made along with a standard Yield Test. The weight of the filled measure is entered on the top line of the test sheet. The weight of the measure is then deducted to determine the net weight of the concrete, then divided by the exact volume of the measure expressed to the nearest 0.001 cu. ft. to obtain the weight of a cubic foot of the fresh concrete "A."

The volume of the ordinary yield bucket should be recalibrated, since some nominal 0.5 cu. ft. measures do not hold exactly that volume. This calibration should be made using the unit weight of water with temperature variation as set out on the data sheet.

The bucket, from which the "A" weight was determined, should then be partially emptied leaving approximately one-half of the concrete in the bucket. The weight of the container and the remaining concrete sample should be recorded "D"; then the weight of the container deducted to determine the weight of the concrete sample "E."

Enough water shall then be added from the water pail to completely inundate the concrete sample, but not enough to bring the water level dan-



★ Fig. 2. Sand base was given trapezoidal section to facilitate drainage from one side. Recap overhang details also shown

gerously close to the top of the container, and the water and concrete thoroughly stirred with the ⅝-in. rod so as to expel all of the air from the inundated concrete. The hook gauge shall then be placed on the container and additional water added to fill the container to the hook gauge point, using the small tin can to carefully pour just the amount of water required to break the dimple which forms in the water surface at the point of the hook gauge. *Remove the hook gauge,* then weigh the container, concrete sample, and water required to fill the container to the hook gauge point. Record this weight (be sure you do not include the weight of the hook gauge), then deduct the previously obtained weight "D" of the container and the concrete sample to determine the weight of the water "F" required to fill the hook gauge point.

When to Consider Water Temperature

Next to compute the value for "G" where: G=volume of water to fill the container in cubic feet= $\frac{F}{62.3}$. The constant 62.3 is used in computing the value "G" assuming the water temperature to be 70° F. It is felt that this value may be used as long as the percentage of entrained air is well inside the 3% to 5% specification requirement, since a substantial change in water temperature will in-

Principal Bid Items on Moellering Company's Job

(Let June 19, 1945, for reconstruction or resurfacing of 5.9 miles of rte. 24 near Ft. Wayne, Indiana, total bid $365,000. Job 65% paving, 17% grading, 14% structures).

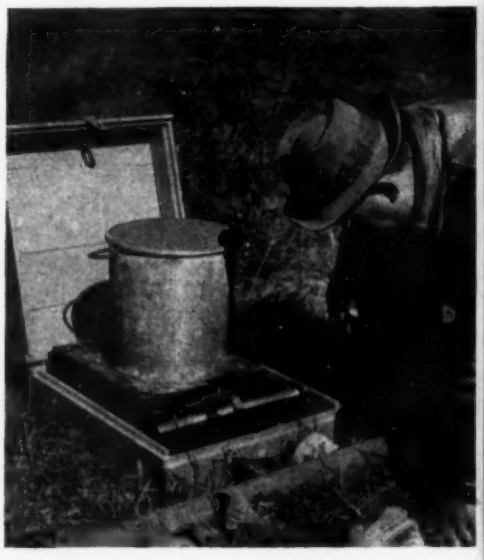
Common excavation	27,794	cu. yd.	@	0.50
Exca., waterway	280	cu. yd.	@	1.00
Exca., wet	1,071	cu. yd.	@	5.75
Special borrow	22,591	cu. yd.	@	0.52
Pavement removal	23,368	sq. yd.	@	0.48
Salvaged pavement removal	11,684	sq. yd.	@	0.48
Finishing shoulders and ditches	30,645	l. f.	@	0.31
Tile (6 in.) for subsurface drains	17,014	l. f.	@	0.55
R/c pavement (9-7-7-9)	44,402	sq. yd.	@	2.60
R/c resurface	31,026	sq. yd.	@	2.25
Concrete overrun	697	cu. yd.	@	12.00
Special reinf. steel for resurf.	29,566	lb.	@	0.08
Contraction joint (poured)	9,991	ft.	@	0.52
Contraction joint (for resurface)	6,981	ft.	@	0.52
Subgrade treatment material	10,290	cu. yd.	@	1.80
Bituminous stabilized mix (A)	1,123	t.	@	6.50
Bituminous stabilized mix (B)	1,078	t.	@	6.25
6-in. traffic lane stripe (iron oxide)	5,655	mi.	@	300.00

Step-by-Step: Field Test for Entrained Air

★ 1. The 0.5 cu. ft. bucket, familiar in the making of yield test, is rammed full of carefully sampled concrete

★ 2. Top surface of concrete is accurately struck off . . .

★ 3. . . . and the sample of air entraining concrete weighed and weight recorded



★ 4. About half of the concrete is then dumped out, and weight of remainder recorded

★ 5. Water is added to inundate the sample, the mixture stirred to free entrained air

★ 6. Then comes the "hook gauge" procedure as described in text

★ Pressure spray cart did fine, but windy weather pointed to need for some positive means of assuring uniform curing application

★ A neat "roll" in front of the finisher is another characteristic of air entraining concrete

STATE HIGHWAY COMMISSION OF INDIANA

AIR CONTENT REPORT

CONTRACT NO.--------- ----------PROJECT NO.-------- SECTION----- ----------194--

Test Number	1	2	3	
Weight of Container and 1/2 cu.ft. Concrete				
Weight of Container (empty, clean, and dry)				
Weight of 1/2 cu.ft. Concrete				
Weight of 1 cu.ft. Concrete				A
Weight of Container and Concrete Sample				D
Weight of Container (empty, clean, and dry)				
Weight of Concrete Sample				E
Weight of Container, Concrete Sample and Water to Gauge Point				
Weight of Conta. er and Concrete Sample				D
Weight of Water to fill Container to Gauge Point				F
Volume of Water in cu.ft. $\frac{F}{62.30}$				G
Calibrated Volume of Container to the Hook Gauge Point				V
Less Volume of Water - cu.ft.				G
Absolute Volume of Concrete Sample in cu.ft.				H
Weight of Solid Concrete on Air Free Basis Lbs. per cu.ft. $\frac{E}{H}$				T
Air Content $= \frac{T - A}{T} \times 100$				P

troduce only a slight error in the percentage of air; however, when the percentage of air content is at either extreme of the specified variation, the temperature of the water should be considered in order to determine compliance with the specification and the constant 62.3 shall be changed in accordance with the table for the unit weight of water, as set out on the attached data sheet.

Let V = the previously calibrated hook gauge volume of the container; then

H=absolute volume of the concrete sample in cubic feet=V-G

T=the weight of solid concrete on an air free basis expressed in pounds per cubic foot = $\frac{\text{weight of concrete sample}}{\text{absolute volume of concrete sample}} = \frac{E}{H}$

P=the air content is determined by the formula $\frac{(T-A)\times 100}{T}$.

★ This report, Indiana form No. I. T. 5958 is arranged as mimeographed 8x11 in. sheet, having space at the bottom for calculations and signature and title of the engineer or inspector making the test

Plans to Be Completed for $12,000,000 Tunnel

Plans and specifications for a vehicular tunnel and highway bridge to connect Norfolk and Portsmouth, in the Hampton Roads area of Virginia, will be completed with $50,000 in Federal funds advanced the Elizabeth River Tunnel Commission by Major General Phillip B. Fleming, Federal Works Administrator. Total estimated cost of the project is $12,100,000.

Plans call for the construction of a 2-lane vehicular tunnel under the Southern Branch, and a 4-lane bridge over the Eastern Branch of the Elizabeth River, together with the necessary approaches, highway connections and appurtenant work. The project has been under study for 15 years.

More Anti-Diversion Progress

Well, old 1945 is gone, and it leaves its mark on the pages of history. Of course there is the war's ending, but what we are thinking of at the moment is what the year brought in the way of highway advancement.

Among the most important advances, little heralded nationally, is the fact that two more states recently joined the anti-diversion procession: Pennsylvania and Kentucky being the latest.

Pennsylvanians went to the polls in November and passed an anti-diversion amendment to the constitution by a huge majority. The vote was 8 to 1 in some sections.

Kentucky folks were just as emphatic, which should give encouragement to leaders in similar fights still to be waged in other states.

We've come a long way since 1937. In that year only four states had provisions in their constitutions against diversion of highway revenues for non-highway use. Now the score is eighteen. The record shows that *wherever this issue is put up to the citizens of a state, clearly and without complicating it with other matters, the tide of public sentiment is overwhelmingly in favor of using road money only for roads.*

This fact should be a strong clue to politicians everywhere, and it should be brought repeatedly before the public in the states which are still singling out motorists for hundreds of millions of dollars to pay for schools, relief and other non-highway outgo.

A Constructive Stand

New York's superintendent of public works, Charles H. Sells, is to be commended for his clear-thinging stand on the question of how far a public body should go in competing for contractors in this inflationary boom market. His remarks, given before a contractor group recently, are published in this issue.

New York state's postwar highway program has been much in the news because it is the biggest state program, one of the farthest along in advance engineering, yet among the slowest in efforts to let contracts and get going. Of thirty million dollars' worth of work advertised since V-J day, only 40% of the offerings were successful. Contractors have been conspicuous by their absence from these lettings, and most of those who bid put in alarmingly high figures. On one recent offering of thirteen highway projects, sixty-one sets of plans were taken out by nearly that many contractors. Six projects drew no bids, and one no acceptable bid.

Naturally highway leaders as well as the long-suffering public are concerned over this whole business, which is part of the nation's reconversion pains. But perhaps we've all been in too big a hurry. Much progress should come out of the joint contractor-engineer meeting suggested by Mr. Sells. Other highway departments faced with a bid impasse will do well to hold similar contractor meetings.

Meanwhile highway work in some states has attracted more nearly normal bids and lettings have gone ahead well. Our money still says that several hundred million dollars' worth of road and street contracts will be under way by next summer.

Better Designs Cost More

In discussions on the so-called "excessive" bids received lately and the general increase noted in highway construction, one factor has escaped notice. That is the fact that highway departments these days must give a demanding public a generally higher standard product, often embodying more elaborate design features and safety measures than in past years.

This fact as well as rising material and labor costs was cited by Charles M. Upham at a recent highway meeting, where he observed that on careful analysis a state would be justified in awarding contracts that were up as high as 35% over 1941 prices if they are not over 10% above the average mile-index obtained in the 1925-1929 period.

★ Skillful tailgating leaves little for the grader operator to do. About 30,000 cu. yd. of gravel will be put on Antrim County's roads in 1946

Stepped-Up Gravel Production

. . . key to postwar road program in Antrim County, Michigan, which incidentally kept on improving its roads little by little all through the war. 30,000 cu. yd. gravel to be produced and placed on roads in 1946

★ Calcium chloride stabilized roads are kept up largely by trucks with under-body blades

GLACIAL gravel in abundance lies all over Antrim County, Michigan. How to get it onto more miles of roads each year, at less cost, is the key to giving this county the most for its postwar highway dollar in the belief of county superintendent Harold R. Smith.

Gravel for example, helps cure frost boils which are the bumper crop every spring in northern Michigan. A six, 12 or 18-in. layer spread along bad sections to build up the grade has proved to be the most expedient cure for spring break-up ills hereabouts, hot stove league theory sometimes to the contrary.

Gravel also is the cheapest aggregate for the two types of stabilization employed in the county: calcium chloride and tar. And gravel has endless uses in patching, topping out and widening work which is carried on steadily by county maintenance forces.

Hence one of the first major equipment items on the county's order list

throughout the war was a modern portable gravel crushing and screening plant. Delivery was obtained on such a plant in September right after V-J day, and the county used it in a race with winter to get a maximum yardage on the roads in preparation for the snow season and 1946 spring thaw.

Production was hampered at times by the rain, shortage of trucks and clay overburden washed down into the pits by rain.

The county expects to increase the machine's output by substituting a slightly larger dragline for the 1½-yd. shovel used this past autumn. A large hopper for dragline feeding has been ordered. Also six new 2½-yd. dump trucks.

The gravel produced late in 1945 made it possible to resurface 9 miles of road before winter and place metal on 14 miles of new grade built during the summer. This work included easing of several sharp curves, also corrective treatment designed to reduce snow blockage, such as raising grade across creek bottoms, daylighting and widening cuts, etc.

A similar volume of improvements is planned for 1946, for which the county expects to produce 30,000 cu. yd. or more gravel during a 5-month working season with its new outfit. The plan is to work each pit about two weeks. Pits will be located in the various townships. While the bulk of the yardage will be hauled directly to the road and tailgated, stockpiles of 1,000 to 2,000 cu. yd. of gravel will be spotted over the county, one pile for each pit, to be used in patching or filling soft spots.

Quick Move-ups

Much time is expected to be saved in moves between pits. Whereas the old plant previously used required several days to move, the new unit can be pulled out of a pit in 10 minutes, towed rapidly to the new site, and put into operation again in a couple of hours. This feature should encourage more frequent moves, with a resultant reduction of several miles in the maximum haul. The new unit, as all such equipment of the market today, also saves considerable labor. Only three men, consisting of the foreman, a man up on deck and the shovel or dragline operator, are required. An extra man, seen in the accompanying photos raking gravel into the hopper, will not be necessary on this unit when the larger hopper is installed, according to Mr. Smith.

Servicing costs should also be low. Certain greasing points will need attention every day, but the practice already established is for the crew to give the outfit its main greasing and a thorough check-up and tightening, etc., every Saturday, after a 5½-day operating week. The machine is actually operated 8 hours daily in a 9-hour work day.

★ This 2½-ton truck required 1½ minutes to load

★ Small scrapers are kept busy all summer cleaning out ditches and improving short sections of grade

Gravel production costs for this particular county will be far below the cost of crushed stone from the nearest rail shipping points, although it is too soon to know the actual figure.

Stabilization Methods

A word should be said about the road construction practice in Antrim County. In common with other counties up in this part of Michigan, the authorities have had to build up a rather complete network of all-weather roads for farmers and vacationists, yet keep their per-mile costs low. The "McNitt act roads", or extensive township roads loaded onto the counties to maintain back in the 30's, of course have added to the financial problem, as has the very high snow removal cost. The solution has been to grade, drain and place 6 in. of gravel on a few miles each year, at a cost of about $2,500 per mile (prewar figure). (4 in. placed on feeder

★ Hydraulically controlled blades, when set at the forward angle shown, tend to sweep loose material into depressions, ruts and pockets, and compact rather than disrupt the consolidated surface

★ Antrim County's new mobile gravel crushing and screening unit at work in "post-war pit No. 2." Lateral belt not in use is for separate sand production when desired

★ The ½-yd. pit shovel will be replaced in 1946 by a dragline, for which a larger hopper will be installed

roads, 6 in. on county trunk lines.)

These roads are usually stabilized with calcium chloride and clay admixture placed under laboratory control in conformity with Michigan practice. This type of surface has served excellently.

Most county trunk highways have a bituminous gravel surface consisting of a prime and triple seal. The gravel surface is built up to 6-in. minimum thickness (4 in. on feeder roads), shaped with blades and primed usually with 0.3 gal. of T3 tar. About 10 lb. per sq. yd. of ¾-in.-max. crushed and screened gravel is placed at once to keep the tar from picking up under traffic. Next come two successive applications of T3 (0.3 gal.) each followed by 28 to 30 lb. of ¾-in.-max. gravel, then another 0.3 gal. of tar and ⅜-in. crushed stone screenings. Each course is thoroughly rolled.

This construction, usually done with county forces, has proved less expensive than a blade mix, a 20-ft. road costing from $3,000 to $3,200 per mile immediately before the war. Crushed stone was delivered by rail on some of this work, at a delivered cost of about $1.80 per ton plus unloading from car=$2.10 per ton stocked. With cheaper gravel, post-war road construction costs should be no higher than this in spite of higher labor and other costs.

★ County road superintendent Harold R. Smith and gravel plant foreman Jim Bibb

★ How a section of township road was widened and raised and slopes cut back to eliminate drifting.

★ This hillside road was formerly flanked by a steep embankment. High ground at the right was moved into the road to reduce the grade and eliminate a snow pocket

Brilliant Program Promised for ARBA Annual Convention

AN array of authorities on design, construction and maintenance of highways and airports will address the 43rd annual convention of the American Road Builders' Association, Stevens Hotel, Chicago, Jan. 14-17. Maj. General Philip B. Fleming, administrator, Federal Works Agency heads a notable list of representatives of Congress, government agencies, state associations, engineering colleges, highway departments of states, municipalities and counties and others who will make addresses, lead discussions or offer reports.

According to ARBA president James J. Skelley, the Hon. J. W. Robinson (Utah), chairman of the House Roads Committee, and Hon. Jennings Randolph (W. Va.), a leader in airport legislation, will be among the Congressional figures. Herman A. MacDonald, Boston, president of the American Association of State Highway Officials and Massachusetts Commissioner of Public Works, will speak on the co-operative participation of state, county and urban agencies in administering the Federal-Aid Highway Act.

Other well known speakers include Comm'r George H. Field, Bureau of Community Facilities, FWA; Lt. Gen. Raymond A. Wheeler, Chief of Engineers; H. A. Radzikowski, chief of the Division of maintenance, PRA; J. T. Callaway, assistant to the vice pres. Goodyear Tire & Rubber Company, and Spencer Miller, Jr., New Jersey's State Highway Commissioner. Mr. Miller's address will have to do with highway safety.

The Airport Division of ARBA which is concerned with the design, construction and maintenance of airports, will have important sessions headed by Col. E. R. Needles, distinguished consulting engineer, William E. Cullinan, director of the New York Bureau of Aviation, Aubrey Keif of the Texas Company's department of aviation sales, and Thomas Pringle, Office of the Chief of Engineers, War Department, Washington, D. C.

Technical subjects will occupy a prominent place on the convention program. There are twenty committees covering such phases as soil compaction, express highways, grade separations, alignments, grade and right-of-way and many others, President Skelly pointed out. Such experts as Prof. G. P. Tschebotarioff of Princeton; Ben H. Petty of Purdue; Earl F. Bennett, principal soils engineer of the state of New York; O. J. Porter, research engineer, California State Highway Department; W. F. Aid, chairman, Cleveland Transit System, and others will lead the discussions.

The Annual Pan-American Award of the association for outstanding service to highways will be given at the annual banquet, Wednesday evening, Jan. 16, to Thomas H. McDonald, U. S. Commissioner of Public Roads, and Sr. Montes de Oca, president of the Automobile Club of Mexico. He is a former Minister of Finance, president of the Bank Internationale of Mexico and a former president of ARBA's Pan-American Division.

Maryland Resurfacing Stirs Dispute

Newspapers in Maryland recently aired a dispute between Maryland state road commission officials and the state police superintendent over the skidding qualities of recently resurfaced roads. Countering claims by the police that the new surfaces were more dangerous for motorcycles than long-used surfaces, Commission Chairman Robert M. Reindollar defended the mix employed as a "rigidly controlled surface which is skidproof under almost all conditions." The state police chief claimed that motorcycles figured in 13 or 14 recent fatal accidents in his department.

Illinois' New Motorist Safety Law Has "Teeth"

A new Motorist's Safety Responsibility Law takes effect in Illinois on Jan. 1. Written to drive reckless and irresponsible drivers from the road, this tough law requires that a motorist to blame for an accident either make good damages of more than $50 or cease driving. All "over $50" accidents or fatal accidents must be reported to the state.

In Days of Old

Roads and Roadbuilding in Years Gone by

★As roads were built in France around 1830. The paver sets the stones and his comrade rams them home. It was just that simple. The gentleman in the background is the supervisor of operations who sees that an efficient division of labor is maintained. This scene is from a lithograph by Victor Adam

Plans Are Progressing on Detroit's

John C. Lodge Expressway

Detroit joins the list of metropolitan areas in which action has replaced talk. This radial expressway, designed to flank the downtown area, is a $19,500,000 state-county-city-federal cooperative project. Right-of-way, surveys and plans are well under way

By Leroy C. Smith
County Highway Engineer, Board of County Road Commissioners, Wayne County, Michigan

DETROIT, the sprawling automobile capital of the world, will one day have a toward-downtown expressway that will help set a pattern for large cities in the motor age. Advance engineering is well under way on the John C. Lodge Expressway, designed to halve the driving time between the city's northwest area and the central business district. When fully completed it will carry an anticipated peak flow of 4,500 vehicles per hour in one direction.

As shown on the map (Fig. 1) the 3.5-mi. section first to be completed is part of a radial highway which will eventually extend ten miles northwest, joining with the projected James Couzens superhighway enroute. Both forks will, of course, be urban links of state trunk highways. The John C. Lodge Expressway will be crossed by the Crosstown Expressway, slated for immediate design and construction under state direction, as a continuation of the newly completed Detroit Industrial Expressway and Willow Run Expressway system. A major engineering problem is entailed in the elaborate, big capacity interchange to be required at the intersection of the Lodge and the Crosstown expressways.

The Lodge project when extended will also intersect another crosstown facility, farther to the north, the Davison Highway, on which Detroit "cut its teeth" on the expressway idea.

General Design Principles

The John C. Lodge Expressway, Section 1, as finally determined upon, observes the following principles of location which usually must guide the planning of such projects:

1. The location skirts the central business district. Traffic will spill off or enter via a series of ramps leading to the hotel, shopping and office building centers.

2. The location utilizes relatively cheaper right-of-way than any other possible route, as determined from detailed studies of land values. The location passes through extensive blocks having less than $1.00 per sq. ft. assessed land value. It misses all the costly and highly built-up areas, although passing within one to five blocks.

3. The location also represents the usual compromise to avoid or thread through obstacles such as rail terminals, church property, etc.

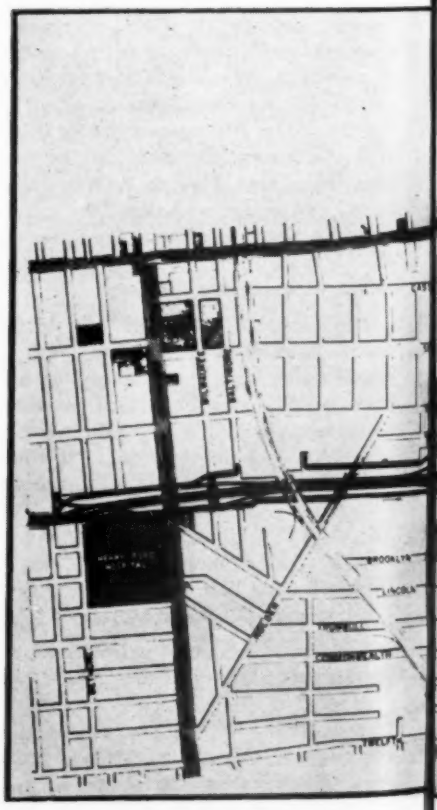
4. The project must connect with state trunk highways and the outlying city areas.

The general design adopted calls for a depressed six-lane divided roadway flanked by service roads at grade. The 3.5-mi. first section is to be crossed by two railroads and 13 highway or street bridges, in addition to the Crosstown Interchange. The 36-ft. pavements will be flanked by 10-ft. minimum clear zones before beginning of slopes or walls, as an aid to snow removal and to provide for proper shoulders and drainage.

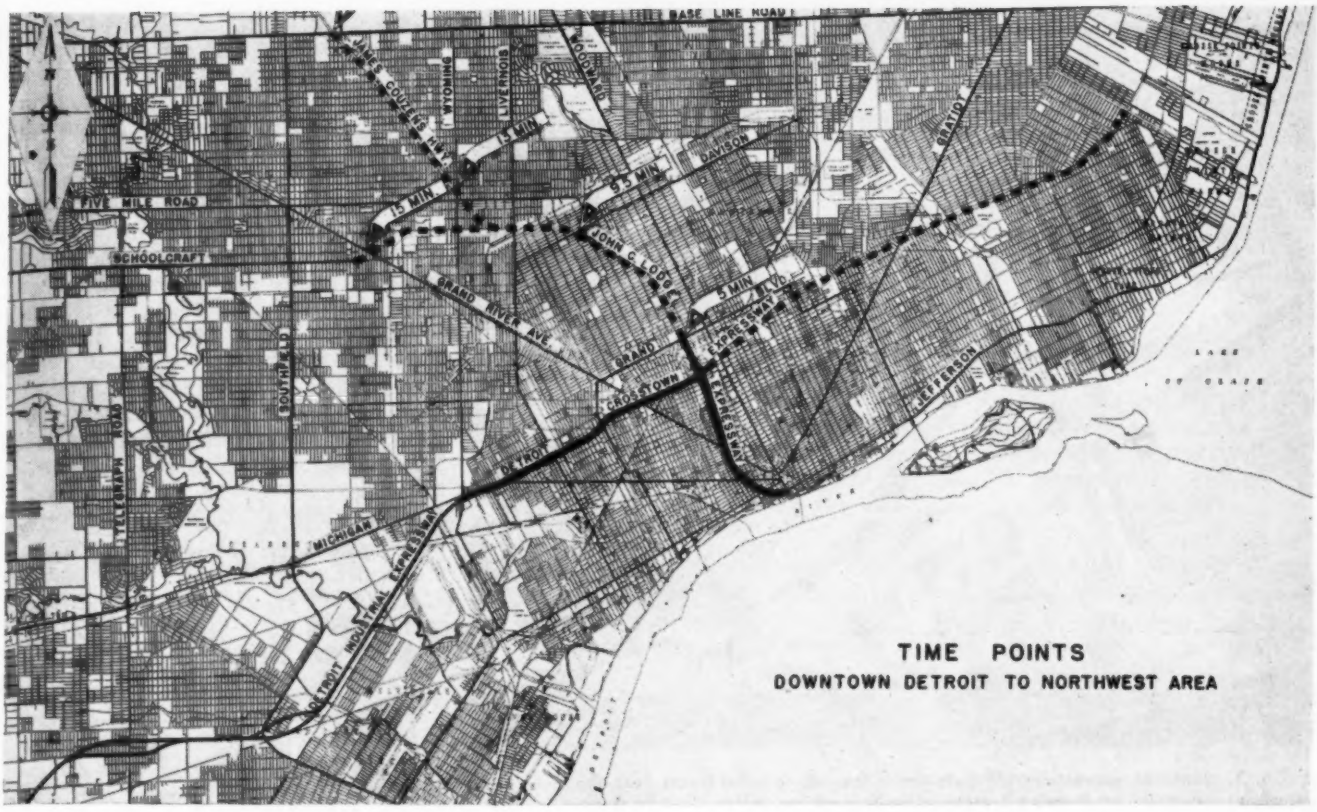
Depressed Roadway Adopted

The original plan, submitted to city officials early in 1944, recommended an elevated structure. This plan was suggested in an effort to avoid closure of downtown streets, disruption of the street pattern and disturbance of complicated underground utilities, as well as to provide a route as close as possible to the downtown business district on a minimum width of expensive right-of-way. Elevated construction was to parallel the river and pass northerly through the westerly edge of the business district to a point north of Grand River Avenue. Here a change to depressed construction was made and this was to be continued to the end of the project.

The publishing of this plan focused the attention of the general public and its responsible representatives on the expressway problem, particularly as to its integration with other plans for proper development of downtown Detroit.



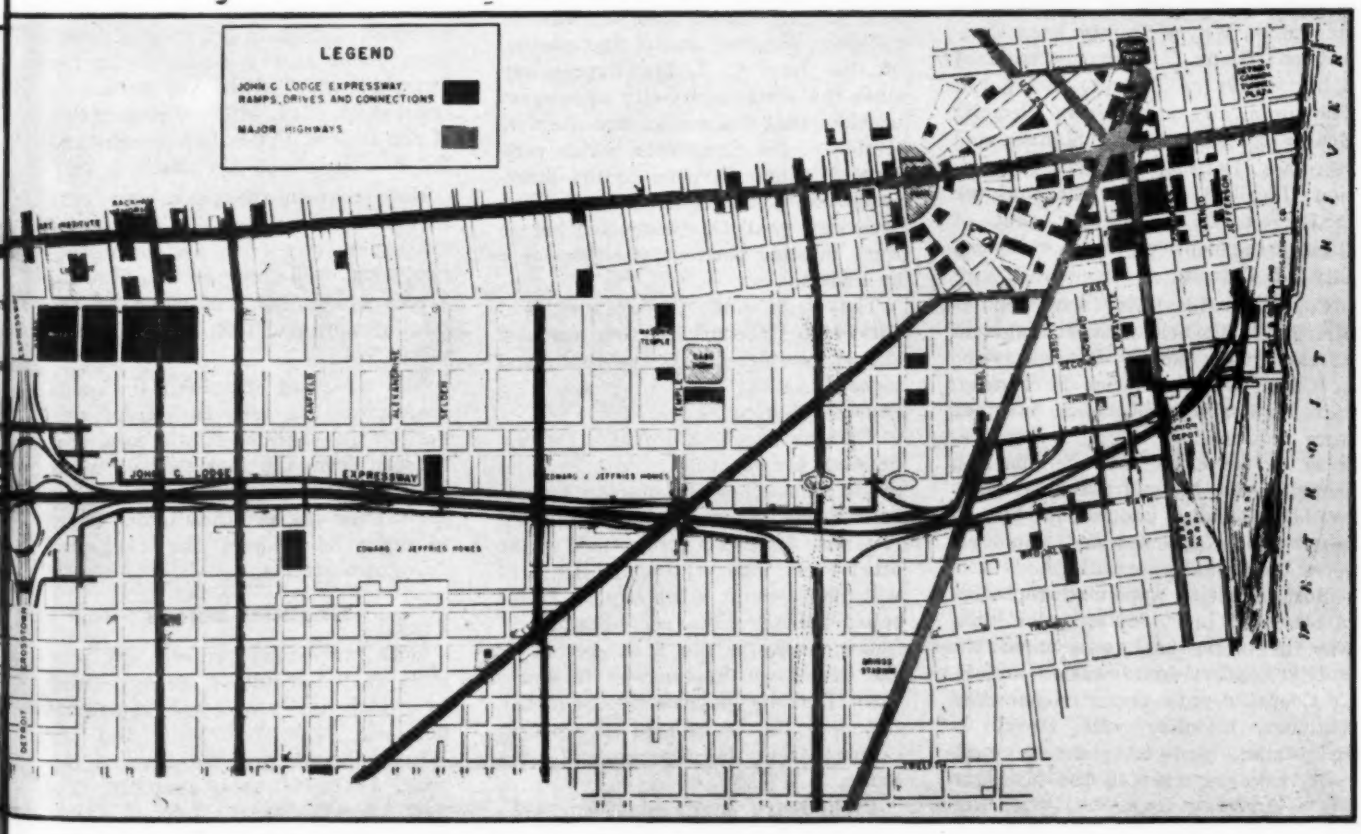
★ Fig. 2. The expressway will flank the central business district and will have a complete integral service road system. The elaborate interchange at the Crosstown Expressway is being designed by the Michigan state highway department (design scheme shown here not necessarily to be the one finally used)

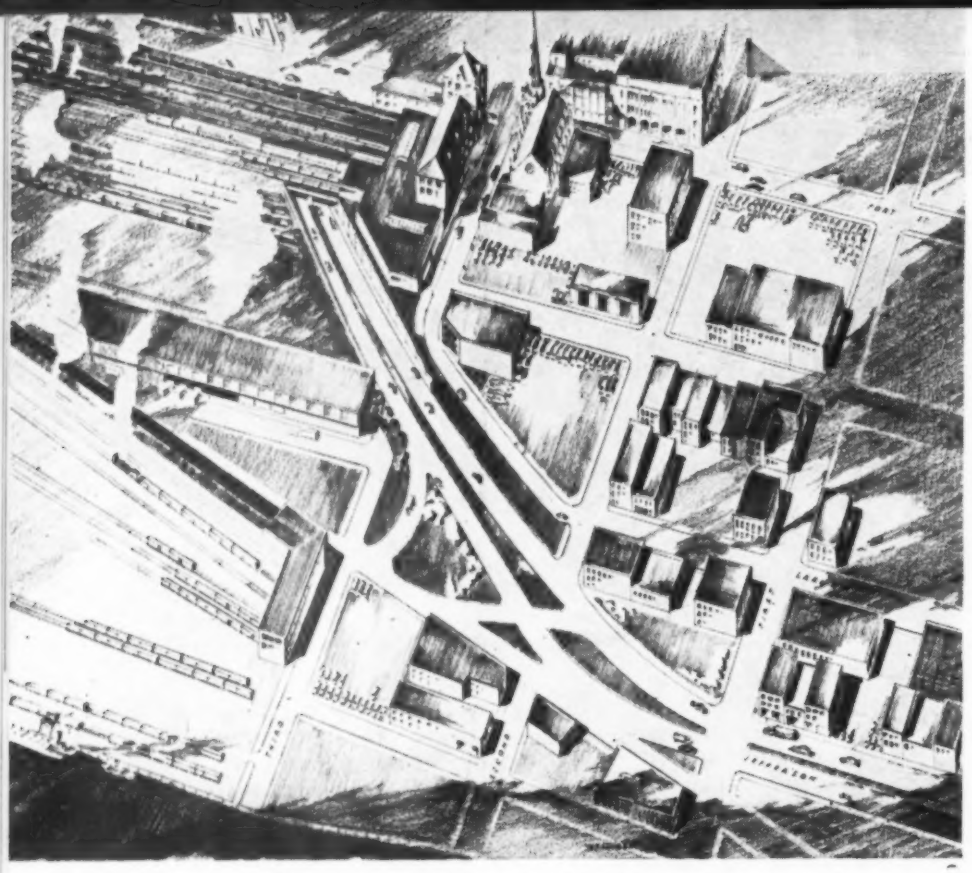


★ Fig. 1. The John C. Lodge Expressway in relation to other Detroit arterials

Official and semi-official bodies of the city immediately brought out for public discussion plans in various stages of completion for civic centers, land use development, medical and educational centers and for other expressway routes and it became apparent that a critical resurvey of all elements of the plan for the John C. Lodge Expressway should be made in the light of this additional information.

Better to accomplish the integration of ideas affecting the expressway and thereby arrive at a plan that





★ Fig. 3. How the expressway will pass under the rail terminal tracks near the waterfront. A major engineering project in itself, involving raising of some tracks and cutting off ends of others

would be indorsed by all interested parties, the Wayne County Highway Engineer addressed a letter to the following engineers and asked that they serve on an Engineering Committee to help formulate plans for the John C. Lodge Expressway: Harry A. Shuptrine, engineer of bridges and structures, Wayne County Road Commission; Glenn C. Richards, supt. of public works of Detroit; George R. Thompson, city engineer of Detroit; George F. Emery, city planner and secretary, Detroit City Plan Commission; Lloyd B. Reid, traffic engineer of Detroit; L. R. Wagner, supt. of engineering dept. of street railways, City of Detroit.

Copies of this letter were sent to Mr. J. T. Voshell, district engineer of the Public Roads Administration at Chicago, and Charles M. Ziegler, state highway commissioner, and they were requested to assign representatives to serve on this Engineering Committee to the end that final plans would be fully understood by all participating agencies and would receive their final approval.

Both agencies appointed representatives, and L. P. Scott, senior highway engineer, has represented the Public Roads Administration and H. C. Coons, deputy commissioner-chief engineer, together with Harry L. Brightman, postwar planning engineer, have represented the Michigan State Highway Dept.

Good Progress Made

Meetings of the Engineers' Committee have been held at the Wayne County Road Commission offices and it is a pleasure to report that the results of its work have been highly satisfactory. Efforts to date have been largely confined to the various problems involved in the first section of the John C. Lodge Expressway since the state-county-city agreement provides that this section and the first section of the Crosstown, which runs from Michigan Avenue to the intersection with the John C. Lodge Expressway, shall be constructed before work on other portions of either route be undertaken.

The basic and topographic field surveys for the first section are now almost completed and the route and general details agreed upon and a general plan prepared.

The first section provides for depressed construction starting from grade connections at Jefferson Avenue near Second (see map) and running to temporary grade connections at the other end. This type of development will give Detroit much needed traffic relief for the area served and will immediately tie the first section of the Crosstown Expressway to downtown Detroit. It can be completed, including time consumed in property condemnation, in approximately 3½ years.

Preliminary engineering work has been under way for the past year. Before arriving at the general design it was necessary to make an accurate system survey. This consisted of a series of closed traverses. From this a base line was surveyed from which every physical feature was located by coordinates. First, block corners were located, then all buildings and all utilities were mapped, from which trial locations were drawn and refined until a study of real estate takings showed a near-minimum of property damage and right-of-way cost. Exact alignment having been determined, accurate maps are today being drawn and final real estate takings determined as basis for right-of-way proceedings.

Concurrently construction plans are going ahead on several of the bridges and detailed plans are being worked out for the special problem of passing the expressway through the railroad depot and terminal near the river front (Fig. 3).

The service drives are considered to be a major integral element of design. Their importance in an expressway system is shown by the fact that service roads along the Davison Highway in Detroit carry 8,000 of this system's 43,000 daily volume.

Heavy Peak Flow

Estimated postwar traffic volumes on Section One of the John C. Lodge Expressway are shown in Fig. 4. The volumes are those anticipated before other expressways are constructed. The data are from a downtown traffic survey conducted by the Detroit Traffic Engineering Bureau on October 26, 1944, with the cooperation of the Detroit Police Department and the Boy Scouts of America.

Note that in the peak hour 1924 northbound automobiles will enter the expressway from Jefferson Avenue; 1272 will enter on the Howard Street ramp; 738 will enter on the Bagley ramp and 1693 on the Temple ramp.

The effect of the John C. Lodge Expressway in relieving street congestion in the downtown area can be seen from the fact that as many as 1368 vehicles per hour will use the expressway as far as Grand River in order to by-pass the congested downtown streets.

Financial Details

Both expressway projects are to be built as the result of an agreement by which the state will contribute not less than $3,000,000 and the Wayne County and the City of Detroit, $1,500,000 each annually. The first 3.5 miles of the John C. Lodge

Expressway will cost an estimated 12½ million dollars and the Detroit Crosstown, 16½ million, or 29 million for construction. Another 7 and 5 million dollars will be needed, respectively, for right-of-way, bringing the total to 41 million. The federal government is expected to pay one-half the construction and one-third the right-of-way costs.

In the case of a city the size of Detroit, it is required by statute that the city share in the cost to the State Highway Department on a 50-50 basis. The county may assume part of the city's obligation.

To meet all legal requirements and insure full cooperation (financially and otherwise) between the state, county and city an agreement was entered into on Sept. 19, 1944. The state has designated both the John C. Lodge and Detroit Crosstown Expressways as State trunk line highways and has secured PRA approval to their inclusion as Federal Aid projects. In advance of the passage of the Federal Aid Act and of this agreement, planning proceeded on both the John C. Lodge and Detroit Crosstown Expressways on a co-operative basis with representatives of all parties meeting from time to time to discuss and to determine locations and essential details.

How importance of Lodge Project is Explained to Detroit Public

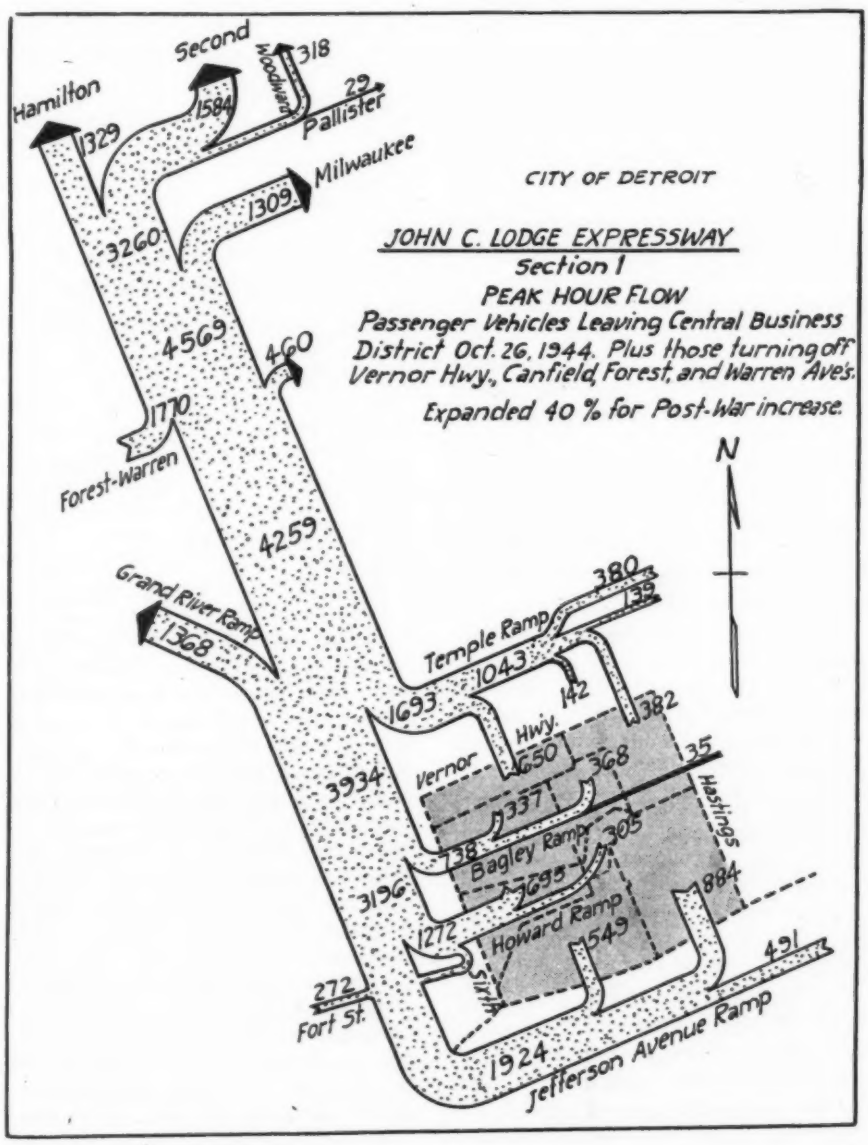
A published statement, prepared by the Wayne County Board of Road Commissioners, which eloquently described the fundamental importance of the limited access or expressway type of development to large cities

Transportation facilities are the framework of any city plan, and therefore of urban redevelopment. In order that cities may function properly, people must be able to travel with safety, convenience and economy —to visit friends, reach factory and store, church and school, doctor and office building, movie and library, park and playground.

The motor vehicle vastly expanded the urban areas and opened up land not served by older forms of transportation. It gave people additional freedom to move out of overcrowded neighborhoods. It gave them week-end trips to the country and to lakes and recreational areas, and through travel widened the whole horizon of modern life.

While accomplishing these desirable results, this very freedom of movement accelerated decentralization, the deterioration of desirable close-in residential areas into slum districts, and the resulting loss of property values in central business districts. It is essential to the future economy of cities that every effort be made to halt or even to reverse these tendencies.

So this coming of the first widely used form of individual transportation brought problems and a need for fundamental changes in cities. But the growth of motor traffic was so great and so fast that only in recent years has the necessity for a solution to these problems become apparent.

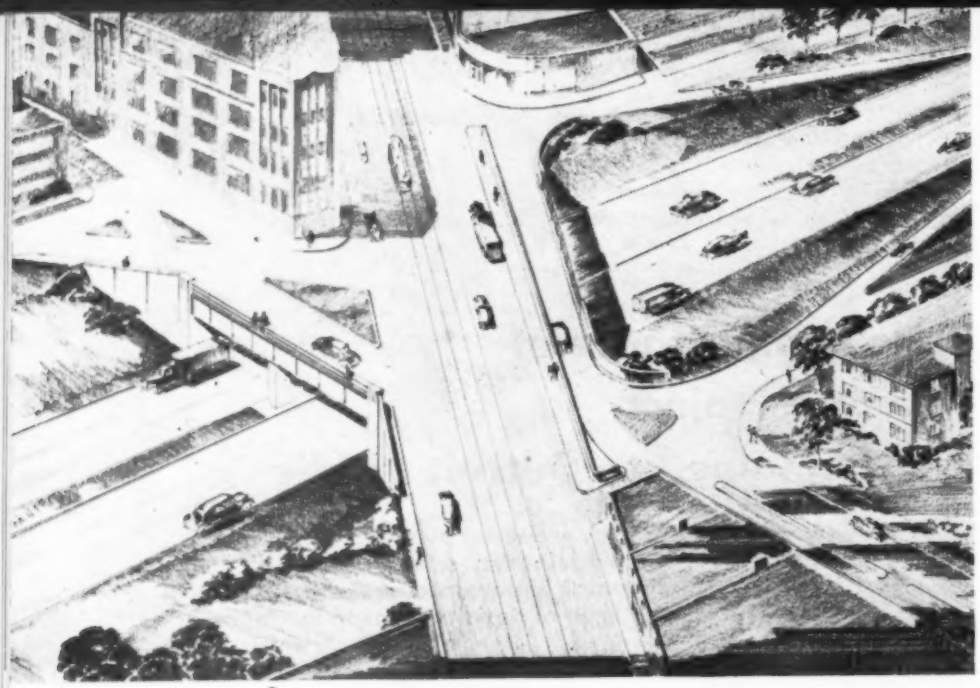


★ Fig. 4. Estimated peak one-way hourly traffic flow

Detroit Has Fine System

The state and county road systems in Michigan were initiated 40 years ago. That period has witnessed the development in the Detroit Metropolitan Area of one of the finest system of highways to be found in any similar area in the country—a monument to consistent and persistent planning.

Within Wayne County itself are found eleven cities in addition to Detroit. Almost as many more are in adjoining counties and within a 20-



★ Fig. 5. Suggested treatment of intersection of the expressway with Grand River Ave.

mile radius from Detroit's center.

The great problem has always been, and still is, to keep abreast of the demands of the unprecedented expansion of the use of the automobile, and the limit of that expansion has not been reached.

It is easy to see that there will be an enormous increase in the number of private automobiles as soon as they can be purchased. In addition to those who have been deprived of their cars through the lack of replacements, there are many more to whom the initial purchase of an automobile is a first priority against their war-engendered savings.

In addition it should be borne in mind that there has been a 20% increase in population in this area during the war. Thus an early increase of perhaps 25% over the pre-war number of private cars is easily foreseen.

Transportation Still Expanding

In the meantime, transportation on rubber by bus and truck is also rapidly expanding. The field of the motor truck has been growing very rapidly and the more modern type of motor bus is in the process of displacing surface street-car lines in many cities.

Thus the problem of keeping up with the needs is ever increasing and becoming more complex, particularly within Detroit itself where congestion just before the war had already become unbearable and uneconomical.

With the probability of the great postwar increase in that congestion, the need for a system of expressways within the city becomes obvious.

Modern Expressway Essential

It is now generally recognized that the modern expressway is essential to the solution. Every major metropolitan area in the country is now busy on plans for such expressways and many have already been built.

These modern urban highways, which virtually free the street system from congestion and accidents, will handle large volumes of traffic safely and expeditiously.

Broadly defined, an expressway is a thoroughfare with no traffic lights, no intersections at grade, with opposing traffic streams separated and with entry and exit limited to a few chosen points where safety can be assured. Cross traffic is provided for at reasonable intervals by being carried over or under the expressway as the case may be.

It is a street for continuous movement of traffic through and around the city, unhampered by start and stop driving, parking or pedestrian problems and with danger of accidents greatly reduced.

Traffic that wishes to travel only a few blocks, or to reach property adjoining the expressway, may use parallel "service roads" which connect to the expressway only at ramps. These service roads also become header streets to carry traffic of secondary intersecting streets to the crossings provided.

Ramp connections to important cross streets will engage the existing street layout for collecting and disbursing expressway traffic, and thus the expressway will carry the major traffic for a wide adjacent band through the city.

At the same time the surface streets will be relieved of the great volume of traffic carried by the expressway, thus immeasurably benefiting existing streets.

An essential of the modern expressway is adequate right-of-way. Proper landscaping of areas not occupied by roadways or ramps gives the entire project a park-like appearance. At appropriate locations and where excess property is available, small wayside parks may be advantageously developed.

Although built to expedite travel of passenger and commercial vehicles, express highways in urban areas also benefit the carriers of mass transportation by facilitating the movements of street cars and buses on surface streets. They offer quick express routes for bus service and the service drives are available for local bus service.

Mass transportation on rails may be provided on the right-of-way of the expressway when sufficient traffic justifies and physical features permit. In this case extra property is of course required, and with other details involved the cost will be materially increased thereby.

A.E.D. Has Veteran Employment Tie-Up

The program of veterans' employment and rehabilitation has been launched by the Associated Equipment Distributors aimed at employing, re-employing and rehabilitating a maximum number of veterans. It has been accepted and endorsed by the Veterans' Employment Service of the U. S. Employment Service, Perry Faulkner, V.E.S. Director, having instructed his field representatives "to cooperate in every possible way."

A.E.D. started its investigation and study of veterans' employment problems long before V-E Day, through a Committee headed by A. F. Garlinghouse of Los Angeles. The aim was to set up machinery to provide employment for every returning veteran once employed in the industry, mental and physical conditions permitting, and also to ascertain how many new jobs and positions might be open to veterans without previous industry connection.

The program provided for appointment of A.E.D. Veteran Employment Representatives in each state. These representatives were to supply officials with data and suggestions to aid in advising veterans; also to send out lists of types of construction jobs available.

Commissioner Sells Outlines

New York's Contracting Policy

Urges contractors-engineer joint meeting to solve impasse of excessive bids; only 40% of offerings this fall successfully bid.

DEFINING State Policy as militating strenuously against any action which might lead toward either inflation or deflation, Charles H. Sells, Superintendent of the New York State Department of Public Works, recently suggested that the contractors of the state call a conference at which they could meet with labor leaders and manufacturers and distributors of building materials and equipment to iron out problems which are currently retarding both public and private construction work.

Speaking before the annual convention of the Associated General Contractors' state group at the Hotel Statler, Buffalo, Superintendent Sells reviewed postwar bidding on state highway construction proposals which are the initial phases of the Department's $840,000,000 five-year program. While New York State has been more fortunate than many other states in the progress of such work, he pointed out that only 40% of the $31,800,000 worth of work offered in the 11 lettings since V-J Day has been successfully bid.

Commenting on this situation, Mr. Sells remarked that in the preparation of an estimate there are many factors to be considered beyond its relationship to the prices for which a contractor will undertake a project.

State Can't Lead Inflation

"I believe nobody will criticize the policy prevalent that public works construction undertaken by the State shall not compete with the attempts of private industry to re-establish itself and to replenish the depleted larder of civilian goods," said Superintendent Sells. "It would be a simple matter for the State Department of Public Works to continually increase its estimates until we found some contractor willing to take the work. The effect of such a procedure, however, on the economic situation as affecting most of the people of the state requires considerable thought. Assuming that the engineer's estimate is constantly revised upwards, inflationary values on construction work would result. While the exigencies of the situation, as far as the state is concerned, might in some measure justify such action, it cannot be forgotten that such an action will have an effect on prices which private industry might have to pay. I do not believe that the state should lead the way in this inflationary process if it may be called by that name.

"Our engineers know the intrinsic value of the labor, of the materials, and of the equipment required for operations under normal or reasonable conditions; and they also know about how much we can afford to stretch our estimates due to the immediate needs of the situation. We do not know, however, how much safety cushion a contractor might need to put into his bid to insure him against all possible losses which might result from the unsettled conditions presently surrounding the labor, material and equipment markets. We do not believe that we should provide in our estimates leeway for such cushions to reach inflationary proportions.

Mutual Profits Sought

"A successful job is one on which harmony, mutual respect and positive intentions prevail. Such an atmosphere creates a profit for both parties—a satisfactory job well performed for the state and a financial dividend for the contractor. These results are expected."

When extenuating circumstances demand such action, some estimates may be revised, he said, adding, "Today there are conditions beyond the control of the engineer, and of the contractor, which preclude a reasonable interpretation of the conditions under which a project must operate.

"Instability exists in material markets. The war took a terrific toll of the natural resources of the country, and insufficient time has elapsed to recreate stock piles and to reinstate processing procedures. Material manufacturers are loathe, and in some cases unable, to quote dates of delivery, or even prices at dates of delivery.

Equipment Needed

"Equipment is still a problem. Many of our constructors patriotically surrendered all of their equipment to war agencies. Most of this equipment is completely depreciated. Some of it is not yet returned to its normal use. New equipment has not yet satisfied the constructor's demands. Many activities are still not completely freed from the effects of the necessary wartime imposed regulations as to production, prices and distribution.

"The solution of these problems is our immediate task. Private industry is chafing at the bit with its construction program, awaiting the green light of a stabilized construction field. All of us who are interested in the advancement of a construction program of any character must lend our efforts to a clarification of the problems involved in the labor market, in the manufacture of materials, and in the acquisition of adequate equipment."

Concluding with an appeal to contractors to initiate action which will lead to an early and complete reconversion of the construction industry, Superintendent Sells said:

"Would it not be possible for the contractors, who are so vitally interested, to call a meeting with leaders in labor and with material and equipment manufacturers and distributors? At such a conference it might be possible to develop mutual understanding and agreements. I know relationships are getting more and more complicated every day but the fact remains that the fundamental principles of cooperation are still simple. Why shouldn't a little honest discussion remove the fog and the bugaboos which when not discussed often assume such formidable proportions. Both our private and public economy depends on an early solution of these problems.

"We have made our blueprints and we have arranged our finances. The construction industry must be placed in a position where it can safely and intelligently commit itself to long-term contracts with reasonable assurance that it can compute a justifiable bid with a margin of profit and be assured of an opportunity to realize it."

City Engineers

Meet at 1945 Public Works Congress

Urban programs—rush or postpone? Concern over high bids and engineer shortage threaded through otherwise optimistic sessions of the 51st annual meeting of American Public Works Association, Chicago

WORRIES over technical manpower shortage, high bid prices, slowness in filling equipment needs, sharply increased traffic accidents, and other special problems were in evidence at the 1945 Public Works Congress, held at Chicago last month. However, America's city engineers and officials were "on the beam," and a great deal of constructive data came out of this 3-day meeting which spotlighted the launching of municipal public works programs to total billions in the decade ahead.

Airports—Who'll Pay?

The airport session, under chairman W. O. Jones, director of public works, Fort Worth, began with the question, can municipal airports pay operating and maintenance costs? A discouraging outlook was voiced. Many airfields taken over by the federal government during the war have not yet been turned back to the cities, and new financial set-ups must be perfected when this occurs. Some cities which have enjoyed high revenues from gasoline sales for military planes will suddenly lose this revenue.

Guy Rollins, Dallas, said that his city, which has Hensley Field (formerly city, now Navy), recently purchased 750 acres and awarded contract for a private flying field. It is hoped that this field will pay, after a subsidy period.

"The Fort Worth airport," said chairman Jones, "has made a profit and begun to amortize its cost in the past three years through service buildings and charging rentals." Permanent buildings will be written off in ten years, temporary war buildings in three years.

Glenn Richards, Detroit, related that city's ambitious airport program, which is the result of extensive study with help of consultants. He believes that smaller cities will have to cater to personal flying. Even in this metropolis, private and industry flying pays 75% of the revenue derived from the Detroit City Airport, which is now making a substantial profit over operation and maintenance.

Detroit is still subsidizing airfield amortization. Mr. Richards questioned why a city should have to help subsidize a transportation system. Airlines are in such a fast expansion now that they need federal help on new fields, but later on they should be expected to build and maintain airports, he said. Airlines must begin paying more. Mr. Richards suggested that the Conference of Mayors work toward standardization of airport revenue charge rates nationally.

New A.P.W.A. Officers

Lloyd M. Johnson, commissioner of streets and electricity, Chicago, was elected president for 1946, succeeding Stewart M. Weaver, Col., Corps of Engineers.

New vice presidents elected were Maj. Samuel S. Baxter, Corps of Engrs., Philadelphia (eastern region); Albert P. Learned, Consulting Engineer, Black & Veach, Kansas City, Mo. (central region); and Walter Frickstad, Oakland, Calif. (western region). William A. Xanten, Washington, D. C., treasurer. Ed. Cleary, *Engineering News-Record*, New York, and Leland Gare, Ecorse, Mich., became directors.

The APWA's executive director, Frederic R. Bass, who had come from professional retirement to serve during the war period, resigned this post. Major Norman Hebden recently on military leave was reappointed to this position.

★ Maj. Samuel S. Baxter, Corps of Engr., Philadelphia; Mrs. Storrer; Lloyd M. Johnson (APWA) pres. elect), com'r of streets and electricity, Chicago; Mrs. Stewart Weaver; John Leslie, V.P., Pan American Airways (banquet speaker)

★ Col. Stewart M. Weaver (1945 pres. APWA), Corps of Engrs., Washington, D. C.; Father Francis Dolan; Virgil E. Gunlock, com'r of subways and superhighways, Chicago; Mrs. Lloyd Johnson; Leland E. Gare, city engineer, Ecorse, Mich.

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IN AIR-ENTRAINED CONCRETES IT'S THE *"Controlled Air"* THAT COUNTS

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Cities Poorly Advised

A danger voiced was that of trying to operate airports overexpanded during military use. Cities must cut these down. Smaller cities, especially, must keep their airport plans sensible.

Mr. Richards said that city officials generally in recent years have received poor and often conflicting advice from aviation leaders on airport planning. Detroit's site acquisition and property condemnation job, for example, was snarled up by the necessity of starting over on a new location from that recommended by airline officials. CAA officials also undershot on size of field (square mile) in advising Detroit.

Sidewalk Plowing, Other Snow Problems

The snow removal and street cleaning round table was led by William A. Xanten, Washington, D. C., who told of his city's policy of "no parking" from 2 to 8 a. m. on 81 miles of arterial streets during three winter months, enforced to aid quick snow plowing.

Milwaukee practice is to send out a loudspeaker truck and broadcast for citizens to get cars off the street when a snow storm strikes.

The fact that snow problems must be worked out to meet each city's needs was emphasized by an Ishpeming, Mich., spokesman, who said that a big aid locally was to promptly clear all alleys with rented bulldozers after each heavy fall.

Sidewalk plowing was also discussed. Many cities in the heavy northern snow belt employ sidewalk plows, but most larger cities leave walks for individual citizens to shovel. Lack of help has reduced walk plowing.

New York City performed some walk clearing along vacant property last winter, at an average cost of 12 cents per front foot, which was put on tax notice and assessed to owners.

Superior, Wisconsin, plows all walks using brooms and V-plows on small rubber-tired tractors. V's are cut down to clear 13 in. outside the wheels on each side.

Tractors in some cities have front wheels designed for climbing curbs.

Liability for accidents or property damage caused by slippery or unplowed walks was a lively topic. Iowa seems to have the tightest laws. In Washington windrows of snow are legally considered as contributing to a hazard, and accident damages can be collected where a defective walk is involved.

In St. Paul, $100,000 in "sidewalk damage" suits were settled for $8,000, it was cited by Milt Rosen, director of public works.

★ Albert P. Learned, cons. engr., Black & Veach, Kansas City (V.P. elect APWA); Mrs. Gunlock; Mrs. Gare; Roy Phillips, city engineer, Meadville, Pa.; Wm. Sydow, dir. of pub. service, Miami, Fla.

★ Wm. A. Xanten, Wash., D. C.; James Morgan, dir. of pub. improvements, Birmingham, Ala.; Walter Frickstad, city engineer, Oakland, Calif.; Mrs. A. P. Learned; Frederick Storrer city engineer, Dearborn, Mich.; Mrs. Morgan

New Traffic Problems

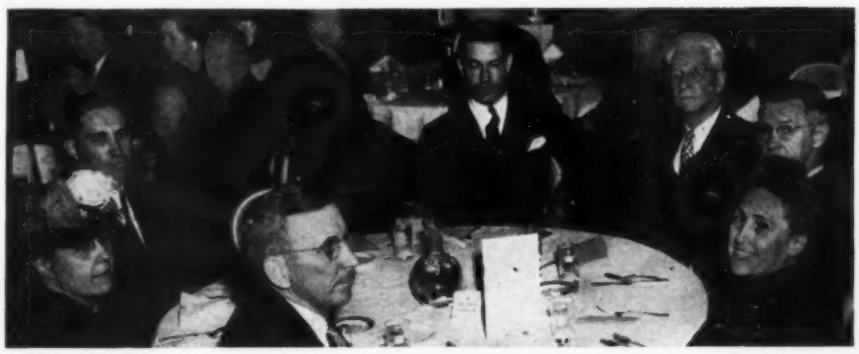
The postwar safety and traffic roundtable was led by chairman Burton W. Maish, American Automobile Assn., Washington, D. C. Among the questions were: What are the most pressing postwar traffic problems? What broad steps are being taken in their solution? Need for accellerating progress toward b e t t e r facilities? What can public works officials do to help most? Sparked by a panel of eight nationally known leaders in the field, this meeting was an outstanding one in the importance and completeness of data brought out. ROADS AND STREETS plans to report it in detail in a forthcoming issue.

Contractor Point of View

The ability of the construction industry to handle the volume of public works planned was discussed by D. O.

★ Twin Cities table: Harold Seavy, Minneapolis; Albert G. Bastes, Chr. Bd. of Trustees, Minneapolis Sanitary District; Geo. Matthews, Minneapolis City Council; Geo. N. Shepard, city engineer of St. Paul; Walter C. Robb, Minneapolis Council; Hugo Erickson, assistant city engineer, Minneapolis; Mr. (and Mrs.) Fred J. Paul, city engineer of Minneapolis.

★ Les. Beck, sec'y to city engineer of Chicago; Loran D. Gayton, asst. city engineer, Chicago; D. E. Kennedy, Chicago waterworks; R. G. Baker, R. E. Roche and E. J. Morgan, with De Laval Co.; W. W. DeBerard, city engineer of Chicago.



★ Mr. (and Mrs.) R. E. Bragstad, city engineer of Sioux Falls, S. Dak.; Russell Becker, engineer, department of streets and electricity, Chicago; Ken Shedd and H. C. Staacke, Gar Wood Industries, Chicago; Kenneth V. Hill (and Mrs.), Greeley & Hansen, Engr., Chicago.

White, president of White Consolidated, Chicago contractors. He cited surveys made recently by A.G.C. and A.R.B.A. which show that contractors have the managerial force and financial ability to handle 7 billions in all types of construction during 1946. Contractors, however, are concerned over the labor situation, which has been complicated by slow military discharge, lack of craft apprentices, deferment of contract awards due to high prices, minimum weekly wage guarantee and other new demands of unions. He foresaw substantially higher labor scales and costs, and urged a review of all estimates prepared more than a year ago.

The fact that highway and airport bids are up 20 to 25% over pre-war figures (and building work 40%) was borne out by Mr. White.

Foreseeing inflationary conditions, another speaker, Dr. Neil R. Jacoby, Vice President of the University of Chicago, prophesied a general construction level too great for the existing labor market. He took the view that it would be sound public policy to postpone public works, giving industrial construction the priority for the time being in order to best utilize available manpower.

George B. McKibbin, director, Illinois Postwar Planning Commission, said that Illinois has a $1,335,000,000 public works program, of which only one-third is past the idea or preliminary stage. This includes a 209-million-dollar long-range need on the Illinois primary highway system. Illinois has $140,000,000 in accumulated funds. He advocated controlled release of construction to fit employment needs.

Walter Swietlik, Milwaukee commissioner of public works, made five suggestions for a logical reconversion program of any city public works department:

1. Build up your engineering staffs.
2. Avoid large programs at this time which will compete with labor in a tight market.
3. Begin first on urgent projects held over from before the war.
4. Avoid past excesses of the kind which left unpaid assessments where anticipated building booms failed to materialize.
5. Hold volume in abeyance for lower construction prices.

Mr. Swietlik believes that postwar construction by cities usually is not needed at this time as an employment factor, current unemployment being a passing phase.

Federal-City Cooperation

In the Roads and Streets sectional meeting considerable time was taken on the new relationship between cities and state highway departments resulting from the Federal Highway Act of 1944 ($125,000,000 f. a. for urban highways, supplied through states). One speaker from an eastern city complained that his city has had not one word on the amount of funds allocated. An Iowa spokesman (Graham of Davenport) said his city took the initiative and submitted an urban plan to the state.

A Colorado city engineer told of the advantage in his city's long experience in dealing with the state highway department. That department has an urban contact man, and federal funds are budgeted to cities.

Urban highway funds, as a result of following city lines, are tending to be concentrated in the "corporate" portion of large city areas, which draws rural highway funds into the picture for suburban or approach sections of the state highway system.

A Louisiana speaker mentioned the importance of mapping out city-street connecting projects that tie in with urban links of inter-city federal aid highway projects.

Pavement Design Trends

Design discussion revealed a tendency toward keeping some of the economies adopted during the war, as a means of conserving funds—for example, half-soling worn pavements and other salvage. One engineer reported try-out of a 1-in. bituminous treatment for worn concrete, as against 2-in. normally preferred, applied with or without a tack coat.

In Detroit, cooperative projects

★ J. G. Eierman, eng'r of st. cleaning, Baltimore; Sol Ellenson, asst. dir. of P. W., Newport News, Va.; Michael Kelly, dep. com., New Orleans; Geo. A. Carter, dep. chief engr. of Baltimore; Geo. H. Elliott, Jr., Baltimore; C. W. Stump, Jr., city engr., Hagerstown, Md.

• • • POWER WITH • • •

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Air-Cooled Engines

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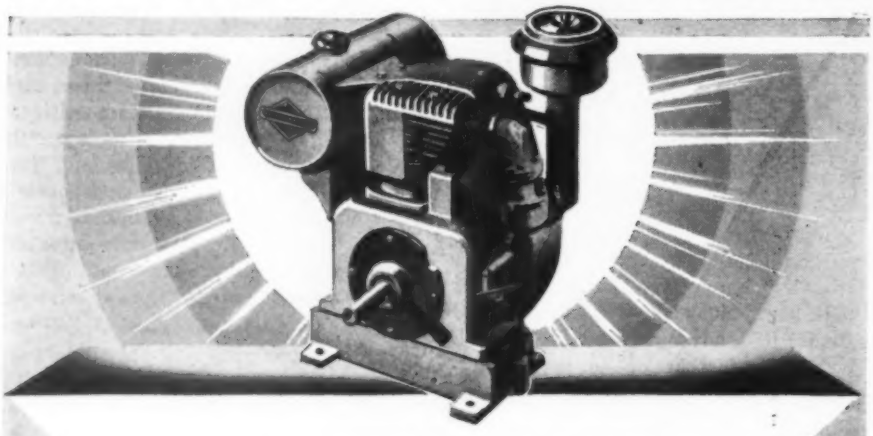


In a brilliant record of dependable and economical operation — well above 2¼ MILLION Briggs & Stratton 4-cycle gasoline engines have *earned undisputed* recognition as "preferred power" the world over. Current models are the result of skill and experience gained during more than 26 years of *continuous production* of single-cylinder Air-Cooled engines—and constant advancements in design and precision manufacture. These distinctive Briggs & Stratton advantages are your assurance of *maximum performance*—the *right power*—whether you build, sell, or use gasoline-powered appliances, machinery, or industrial equipment.

BRIGGS & STRATTON CORPORATION
Milwaukee 1, Wisconsin, U. S. A.

4 CYCLE
BRIGGS & STRATTON
GASOLINE ENGINES

Air-Cooled Power

Like Our New Suit?

Perhaps you've noticed the new appearance of ROADS & STREETS. Heavier, glossier paper, now that the war's over. Clearer printing and illustrations. A new style of article headline type, designed for easier reading and better appearance. It's all window dressing in a publishing program aimed to bring you the most significant and interesting developments in postwar highway, street, bridge and airport design and construction. Watch for future issues.

have gone forward on a 50% city, 25% state, 25% county basis, after which they will be carried to a higher phase with federal funds. The practice has been to resurface a 3-ft. gutter strip on bituminous pavements where parked cars have created a worn or wavy condition. The old surface is painted and 1½ or 2 in. of new material rolled and sealed.

H. F. Klemmer, Washington, D. C., described the successful use of 1¼-in. binder and resurface, sealed with a sand 100% passing ¼ in. and 100% retained on No. 20 screen. He said, "You must have a surface to reseal. If it isn't good enough for a hot-mix cover, it isn't good enough to salvage." (Note: new asphalt specifications, a revision of 1936 edition, are to be published by the American Public Works Association.)

Residential Street Practice

Residential and low-cost street construction was reviewed. Detroit practice on new streets has been to put down 8 in. of coarse stone, roll and apply penetration; cost about $1.50 per sq. yd. for surface only. Washington, D. C., uses oil-slag stabilization, at about 75 cents per sq. yd.; grade set for later coverage with 6 in. pavement. Dearborn, Mich. (Storrer) sees economy in placing new concrete, which costs about $1.70. One New Orleans street trend is toward a low strength (1600-lb.) lean concrete, with increased slab thickness, using reinforcement and no joints. Ardmore, Pa., requires that subdivisions put down 10 in. minimum thickness of pavement under city inspection.

Another city reported that it had begun to require that subdividers submit a preliminary or record plan on linen, to help force proper grading of new streets. Also helps discourage wildcat developments and later piling

Proved...

As No Other Rotary Snow Plow Has Been Proved!

• There are more Snogos in service than any other make of rotary plow. Behind Snogo is 18 years of service in the hands of highway departments, municipalities and airports. Repeat orders from state and county highway departments and cities of all sizes offer an array of testimonials to length of service and quality performance that can't be equalled.

A rotary plow is an operating piece of mechanism not to be compared with a blade hung on the front of a truck and depending on the brute force of the truck for action. It's as dead as a dodo if it doesn't operate.

After a blizzard when miles of highway are snowed under and drifted over is no time to experiment with somebody's untried machinery. Then is when you want a proved machine you can depend on—a Snogo. There is a Snogo for every budget from a 1-½ ton truck to the largest four wheel drive type of truck. Ask for details.

KLAUER MANUFACTURING CO.
Dubuque, Iowa

SNOGO A SNOGO For EVERY BUDGET

Postwar Programs
—how they're coming along

Notes on additional state, county and city plans, and progress with lettings

California's Program Among Nation's Biggest

CALIFORNIA's slogan is indeed to "make no little plans," to quote Chicago's late Daniel Barnham, as evidenced by the following statement from Fred Grumm, asst. state highway engineer:

A year ago the California Highway Commission approved the Division of Highways postwar construction program. This program was designed to overcome some of the increasing critical deficiencies in the state highway system, to provide rehabilitation of the system from the accumulated deterioration and traffic demage of the war years, and to bring to modern standards obsolete sections in the over all development. The immediate postwar State highway program includes highway and bridge construction estimated at $115,000,000. This program is based upon anticipated revenues (State, Regular Federal Aid and Urban Federal Aid) over the next three years and is expected to cover four years of construction.

That this program is just a start is revealed in a report made to a State Legislature Committee a year ago where the critical deficiencies of the State highway system were summarized as requiring $630,000,000 for their correction. A review of the data in this report, coupled with studies of the past year, made late in 1945, has raised the estimate to $635,000,000.

From the $115,000,000 postwar program the California Highway Commission has allocated funds in the amount of $40,000,000, plus an additional $8,000,000 for right of way, for a list of construction projects to be advertised for bids during this first postwar year. Preliminary engineering and right of way acquisition is now complete on many of these projects and it is planned that advertising will begin before the first of 1946, provided Federal approval is obtained.

The advertising schedule provides for calling for bids at the rate of about $2,000,000 a week. Preliminary work on the projects included in the remainder of the $115,000,000 is so well advanced it is anticipated that a comparable advertising schedule will be maintained as Federal funds become available during the two succeeding postwar years.

Freeways Being Pushed

The first year's program includes considerable freeway development in urban areas where traffic congestion is serious, notably the Hollywood Parkway and Santa Ana Freeway in Los Angeles, the Bayshore Freeway on the San Francisco peninsula and the East Shore Freeway through Oakland to the south on the easterly side of San Francisco Bay. In addition to these, the program includes considerable mileage of rural arterial development and replacement of many critical bridges. Of the $40,000,000 construction cost of this initial program, an estimated $10,000,000 will be expended for bridges and highway grade separations.

The 1945 session of the California State Legislature appropriated $12,000,000 to counties for matching State apportionments of $15,000,000 Federal Aid Secondary or Feeder Road funds for the three postwar years. This legislative act requires that 87½% of Federal Aid Secondary funds be expended on County Roads. Engineers from the Division of Highways staff have been working with the counties in the selection of county roads eligible for participation with Federal Aid Secondary funds and to date resolutions relative to the selection have been received from the Boards of Supervisors of 53 of the 58 counties in the State. Actual postwar programs for the first year have been submitted by seven counties.

Some of California's First Big Projects

Among 72 jobs listed in a partial program for the 2 years ending June 30, 1947:

Oakland—bridge on East Shore	$ 980,000
Los Angeles—4-mi. sect., Hollywood Parkway	5,500,000
Los Angeles—3.6-mi. of Santa Ana Freeway	4,600,000
Los Angeles—4-level grade sep., Hollywood Parkway at Harbor Freeway	1,600,000
Bridge and approaches, Marysville	2,183,000
12-mi. road job near Petaluma, Route 1	1,994,000
8½-mi. road job, Monterey County	1,035,000
Sacramento—viaduct and 4 miles	1,924,000
16½-mi., San Bernardino County	2,584,000
San Diego—7-mi. arterial	3,666,000
Bay Shore Freeway, 8-mi. sect., Santa Clara County	2,528,000

Notes From Other States

Alabama delayed about a million dollars in lettings this past fall to acquire right-of-way. Sizable letting planned in January.

Oklahoma scheduled 5½ million dollars in lettings in November and December, including one large project.

Massachusetts planned to let 8 projects totaling three million dollars late in 1945, including a circumferential and a by-pass project.

Utah had nine jobs totaling $1,770,000 ready with P.R.A. approval. Comprising pre-war hold-over work, these jobs included a $450,000 relocation and viaduct at Ogden and a 600-ft. bridge over Green River on U. S. 50. Completion of widening between Payson and Brigham City, 121 mi., is an important pending project, with 63 miles to be done.

Cities and Counties Heard From

Los Angeles has outlined an immediate public works program which includes 86 street sewer and storm drain projects, 26 "major street and highway" projects and 14 street maintenance projects totaling about six million dollars, according to Lloyd Aldrich, city engineer.

Baltimore—While sewers and other public works loom large in this city's postwar job, the budget request is calling for a large program of replacing worn out paving on main thoroughfares according to Chief Engineer Nathan Smith. No figures given. Two bids have been in excess of funds appropriated.

Omaha—According to City Engineer E. W. Woodbridge, this city plans $1,250,000 runway and other improvements at its municipal airport, part already let.

Tulsa County, Okla.—Bonds voted Nov. 20 for $1,750,000 to finance improvements of 150 miles of county

roads and four major bridges. George O. Straughan, county engineer.

Alameda County, Calif.—Preparing plans for highways and bridges involving three million dollars, all to replace obsolete facilities. Projects near urban areas to come first. Road construction generally to consist of 6 inches or more of crusher-run base with bituminous surface; some lettings early in 1946. Wallace B. Boggs, county surveyor.

Portland, Ore., is working on plans for an elevated approach to Hawthorne Ave. bridge, two million dollars, bids "some time in 1946." Ben S. Morrow, city engineer.

Missouri—Any ten adjoining counties may act to establish a district highway commission, for mutual maintenance of local roads, under a bill in the state legislature. The legislative is also considering a 3-year state road plan for a $60,000,000 program, financed through $1,052,000 general funds, $24,100,000 additional bonds, $12,300,000 state highway revenues for primary and $1,800,000 for urban f. a. projects, $20,000,000 bonds for secondary f. a. program, and $10,000,000 for farm-to-market roads, counties paying 50 per cent.

Cuyahoga County, Ohio (Cleveland)—Bids early in 1946 on a $2,600,000 secondary Federal Aid and county road program, 21 projects of all types.

Pierce County, Wash. (Tacoma)—Largest job in offing is a new half-mile bridge over Puget Sound at Hales Passage. Lester M. Corey, county road engineer.

Du Page County, Ill.—Typical of middle western county problems, this county is faced with replacing bridges in poor condition before doing anything else, also with lending engineering help to township highway commissioners. The 1946 season, however, is to see 17 miles of Federal Aid secondary road work; E. L. Gates, county supt. of highways.

Anne Arundel County (Annapolis)—Bridges are the big projects here. A joint project with state is to be let soon for bridge over Spa Creek at $520,000 and another one over Stoney Creek for a similar sum.

Chautauqua County, N. Y.—This county, like many others in New York, does practically all of its work by force account. A five-year program interrupted by the war plus some special reconstructions is docketed in addition to a 3 year program of reconstruction of county roads involving principally a new bituminous topping. W. Bruce Chilson, county supt. of highways.

Sangamon County, Ill.—Over 300 miles of township road improvements, mostly comprising short 2 or 3-mile sections, will be undertaken in 1946. Oiling and graveling to form low-type, low first cost roads is to be the general policy, according to Ray V. Tilly, county supt. of highways.

A. A. S. H. O. Leaders at Autumn Executive Meeting in Chicago

Officers and executive committeemen of the American Association of State Highway Officials, left to right: Bernard Touhey (Ariz.), vice pres.; D. C. Greer (Texas); R. H. Baldock (Ore.); J. Stanley Williamson (So. Carolina); M. J. Hoffman (Minn.), 1st vice pres.; Carl W. Brown (Mo.); Hal H. Hale, Executive Secretary; Herman A. MacDonald (Mass.), president; Thomas H. MacDonald (Commissioner, P.R.A.), exec. comm.; George H. Henderson (R. I.), Treas.; C. W. Phillips (Tenn.), vice pres.; T. H. Cutler (Ky.); H. E. Sargent (Vermont); F. E. Everett (N. Hampshire); F. R. White (Iowa); W. W. Polk (Ill.), vice pres.; C. H. Purcell (Calif).

Underground Parking Facilities

Several cities have gone underground to provide off-street parking facilities, according to a survey by the Commerce and Industry Association of New York.

San Francisco has constructed a 1,700 car parking garage, four stories in depth, beneath a city park in the business area. Private capital leased the subterranean land area, at a $5,000 annual rental aand pays an additional $15,000 property tax a year to the city. Another corporation operates the garage.

Detroit, by referendum, voted this year to construct a 1,000 car garage beneath a city street to be municipally operated. Los Angeles is seriously considering the construction of .a 2,700 car garage beneath a local park.

Cleveland permits parking of 700 cars in an underground exhibition hall, when the space is not otherwise occupied. The U. S. Government for the past four years has been using this exhibition hall for storage but it is now being vacated and will be restored to its original purposes. Parking charges were 25c a day.

Road Magnet Prevents Punctures

In 6 months operation in 1945 on gravel surfaced trunk highways the road magnet of the Minnesota State Highway Department picked up 5,072 lbs. of scrap. Each pound averaged about 100 nails, tacks, screws, staples, hairpins, bits of wire and other metal. The road magnet was used on 2,180 miles of highway and the pick-up averaged 2.3 lbs. per mile.

THIS "LIVE BOOM" PAVER LOWERS COSTS

Let's consider the unique advantages of the boom on a standard 34-E Ransome Blue Brute "Dual Drum" Paver to see why you can lay more yardage . . . more accurately . . . with less manpower . . . than with any other paver.

Because this boom is really a "live boom" just like your crawler crane, it can be power-elevated to allow 9 ft. clearance under the bucket. And the paver can be operated *continuously* with the boom in the elevated position.

Think what that means. Whenever you want, or as often as you want, you can concrete retaining walls, abutments, headwalls, etc. in one operation *at the same time you lay the slab.* You eliminate the extra expense of doing those operations separately.

Moreover, because this "live boom" *spreads as it swings* it covers wider area with each batch . . . cuts down on costly hand shoveling.

OTHER BLUE BRUTE PLUSSES

In addition, a Blue Brute "Dual Drum" Paver has the fastest-charging, self-cleaning skip . . . hydraulically-controlled bucket, eliminating split batches . . . metal-to-metal spiral cut-off for precise water measuring . . . mechanically-operated batchmeter for all-season accuracy. These and other features are described in detail in Bulletin 208. Write for it.

24R5-3

KNOW YOUR BLUE BRUTES

Your Blue Brute Distributor will gladly show you how Worthington-Ransome Blue Brute construction equipment will put your planning on a profitable basis and prove that *there's more worth in Worthington-Ransome.* Act now! His name is listed on page 83. The number beside his name indicates the Blue Brutes he handles.

1.
Blue Brutes include: Pavers, Concrete Spreaders**, Concrete Mixers, Concrete Placing Equipment, Big Mixers, Finishing Machines**, Pneumatic Placing & Grouting Equipment, Truck Mixers, Plaster & Bituminous Mixers, and accessories.

2.
Blue Brutes also include: Diesel, gasoline and electric driven Portable Compressors from 60 to 500 cu. ft. capacity in mountings to suit all jobs; Rock Drills and Air Tools in a wide range of weights and sizes; Contractors' Pumps.**

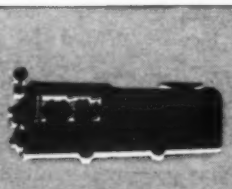
**Postwar Products

BUY BLUE BRUTES

Truck Mixers
Capacities:
3, 3, 4½, 5½ cu. yds.

Portable Mixers
Capacities:
3½, 7, 10, 14 cu. ft.

Big Stationary Mixers
Capacities:
28, 56, 84, 126 cu. ft.



Pneumatic Placer
Capacity:
7, 14, 28 cu. ft.

WORTHINGTON

Worthington Pump and Machinery Corporation, Worthington-Ransome Construction Equipment Division
Holyoke, Mass.

Worthington-Ransome Blue Brute Distributors

By referring to the advertisement on page 82, you'll learn the meaning of the (1), (2) or (1-2) beside their names.

Ala., Birmingham (1) J. D. Pittman Tractor Co.
Ariz., Phoenix (2) Smith Booth Usher Co.
Ark., Fort Smith (2) R. A. Young & Son
Little Rock (1) Kern-Limerick, Inc.
Little Rock (2) R. A. Young & Son
Calif., Los Angeles (1) Garinghouse Bros.
Los Angeles (1-2) Smith Booth Usher Co.
San Francisco (2) Coast Equipment Co.
Colo., Denver (2) John N. Meade
Denver (1-2) Power Equipment Co.
Conn., Hartford (2) The Holmes-Talcott Co.
New Haven (1) W. I. Clark
Waterbury (1) Contractors Supply Co.
D. C., Washington (1) M. A. Doetsch Machinery Co
Fla., Miami (1-2) Allied Equip., Inc.
Tampa (2) S. M. Regar
Ga., Atlanta (1-2) Tractor & Machinery Co.
Savannah (1) Morgans, Inc
Ida., Boise (1-2) Olson Manufacturing Co.
Ill., Chicago (1-2) Chicago Costruction Equipment Co.
Chicago (2) John A. Roche
Chicago (1) Thomas Hoist Co.
Ind., Fort Wayne (1) American Steel Supply Co.
Indianapolis (2) Reid-Holcomb Co.
Iowa, Des Moines (2) Electric Eng. & Const. Co.
Ky., Harlan (2) Hall Equipment Sales Co.
Louisville (2) T. C. Coleman & Son
Louisville (2) Williams Tractor Co.
Paducah (1) Henry A. Petter Supply Co.
La., New Orleans (1) Ole K. Olson Co.
New Orleans (2) Wm. F. Surgi Equipment Co.
Maine, Portland (1-2) Maine Truck-Tractor Co.
Md., Baltimore (1) Stuart M. Christhilf & Co.
Baltimore (2) D. C. Elphinstone, Inc.
Mass., Boston, Allston (1-2) Clark-Wilcox Co.
Cambridge (2) Field Mach. Co.
Mich., Detroit (1) T. G. Abrams
Detroit (2) W. H. Anderson Co., Inc.
Dearborn (2) Thomas G. Abrams
Flint (2) Grandsen-Hall & Co.
Muskegon (1-2) Lakeshore Machinery & Supply Co.
Minn., Minneapolis (1-2) Phillippi-Murphy Equipt. Co.
St. Paul (2) D. L. O'Brien
Miss., Jackson (1) Jackson Road Equipment Co.
Mo., Clayton (1-2) The Howard Corporation
Kansas City (1) Brown-Strauss Corp.
Kansas City (2) Machinery & Supplies Co.
St. Louis (2) W. H. Reaves
Neb., Lincoln (1) Highway Equipment & Supply Co.
N. J., Hillside (2) P. A. Drobach
Newark (1) Johnson & Dealaman
North Bergen (2) American Air Compressor Corp.
N. M., Albuquerque (2) Bud Fisher Co.
Roswell (2) Smith Machinery Co.
N. Y., Albany (1-2) Milton-Hale Machinery Co.
Buffalo (2) Dow & Co., Inc.
New York (2) Air Compressor Rental & Sales
New York (1-2) Hodge & Hammond, Inc.
New York (1-2) Railroad Materials Corporation
Olean (2) Fraseborn Equipment Co.
N. C., Raleigh (1) Smith Equipment Co
Raleigh (2) Carolina Tractor & Equipment Co.
N. D., Fargo (1-2) Smith Commercial Body Works, Inc.
O., Cincinnati (2) Finn Equipment Co.
Cleveland (2) S. M. Clancey
Cleveland (1) H. B. Fuller Equipment Co.
Cleveland (2) Gibson-Stewart Co.
Marietta (2) Northwest Supply & Equipment Co.
Toledo (2) M. W. Kilcorse & Co.
Okla., Oklahoma City (2) Townsco Equipment Co.
Oregon, Portland (2) Andrews Equipment Service
Pa., Allentown (2) H. N. Crowder, Jr., Inc.
Easton (2) Sears & Bowers
Oil City (2) Freeborn Equipment Co.
Philadelphia (1) Giles & Ransome
Philadelphia (2) Metalweld, Inc.
Pittsburgh (2) Atlas Equipment Corp.
Wilkes-Barre (2) Ensminger & Co.
Wilkinsburg (1) Arrow Supply Co.
S. C., Columbia (1-2) Smith Equipment Co.
Tenn., Knoxville (2) Wilson-Weesner-Wilkinson
Memphis (2) Tri-State Equipment Co.
Tex., Dallas (2) Shaw Equipment Co.
El Paso (2) Equipment Supply Co.
El Paso (1) Mine and Smelter Supply Co.
Houston (2) Dye Welding Supply Co.
Houston (1) McCall Tractor & Equipment Co.
San Antonio (2) Patten Machinery Co.
San Antonio (1) San Antonio Machine & Supply Co.
Utah, Salt Lake City (1-2) Landes Engineering Co.
Vt., Barre (1-2) A. M. Flanders, Inc.
Va., Richmond (1-2) Highway Machinery & Supply Co.
Wash., Seattle (2) Star Machinery Co.
Spokane (2) Andrews Equipment Service
W. Va., Charleston (1) West Virginia Co.
Fairmont (2) Interstate Engineers & Constr., Inc.
Wisc., Milwaukee (1) Mckeel Egineering Co.
Wyoming, Cheyenne (2) Wilson Equipment & Supply Co.

Buy Blue Brutes

Worthington Pump and Machinery Corp.

Worthington-Ransome Construction Equipment Division
Holyoke, Massachusetts

PHONY "FREE ENTERPRISE"

By Halbert P. Gillette

IN 1858 Lincoln said: "A house divided against itself cannot stand. I believe this Government cannot endure permanently half slave and half free." His reasoning as to bodily freedom applies also to economic freedom. There can be no successful compromise between freedom and non-freedom. Yet President Truman is trying to effect such a compromise in 1945, as did Stephen Douglas in 1858.

President Truman advocated "free enterprise" in several paragraphs of his recent broadcast, while in other paragraphs he proposed manacling industry by price regulation. He drew a cheerful picture of capital and labor bargaining freely as to wages—but with the proviso that, at least for six months after a wage rise, there must be no rise in the price of what they produce, and then only if approved by federal agents. He argued that price inflation must be prevented, but failed to point out that as to the wholesale prices of farm products an inflation exceeding 100 per cent had occurred since 1939. He spoke of the price inflation of World War No. 1, yet it was no greater than occurred in World War No. 2, insofar as wholesale prices of foods and cotton are concerned. He dwelt on the "disastrous deflation" in 1920, but did not mention that inflated wage rates did not recede at all, but continued rising till 1929.

The accompanying table gives the average factory wages per annum, which were typical of wages in general. In the last column the ratios of average wholesale prices to those in 1913 are given. From this it will be seen how distorted is the picture that the President drew. The table also shows that for 90 years American wages had closely followed the trend of per capita money, until wage control began when America entered the war. No census data are available as to average factory wages in 1945, but the weekly wages reported by the Bureau of Labor show that in factories in March 1945 they were at the rate of $2255 a year.

The most significant fact in this table is that under really free enterprise, the average "real wage" (measured in the goods that the "money wage" buys) was 3.3 times as great in 1939 as in 1849. Second in significance is the fact that annual wage rates rose for 90 years almost at the same rate that per capita money increased. Our per capita money will soon be three fold what it was in 1939. Each month sees one per cent or more added to what it was last June 30. Every bond issue insures that the Federal Reserve notes will increase. The basic inflation has been in that "paper money." The government goes on throwing that sort of tinder into the inflation bonfire, while lustily calling on the public to put the fire out! The President's economic advisers are ignoring the history of the relationship between "money wages" and per capita money. They are also ignoring the history of repeated failures by other governments to control prices without causing either "black markets," or, what is worse, persisting economic disease caused by the control "medicine."

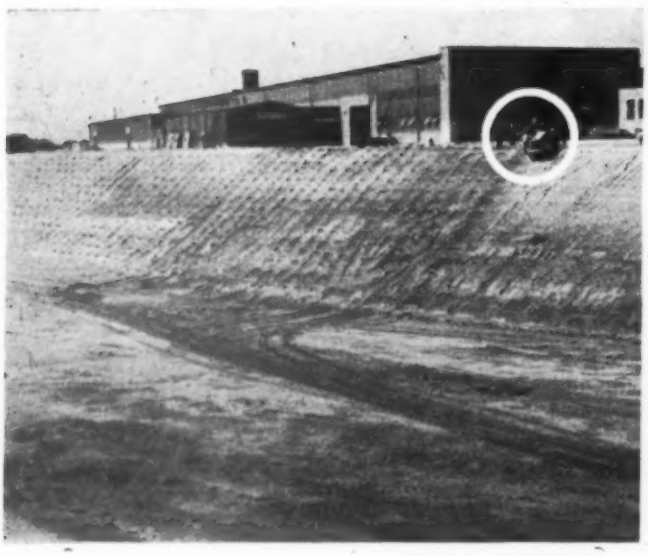
Factory Wages, Per Capita Money and Wholesale Prices

Year	Annual Wage	Per Capita Money	Wholesale Price Ratio
1849	$ 247	12.02	83
1859	281	13.85	90
1869	378	17.63	122
1879	347	16.75	87
1889	445	22.52	89
1899	458	25.62	75
1909	516	35.41	94
1914	552	34.35	99
1919	1,141	53.71	198
1925	1,269	53.13	148
1929	1,300	54.33	136
1935	1,015	52.68	114
1939	1,152	79.97	110
1945	.....	218.73	...

Footnote: Per capita money outside the Treasury as of June 30. Average wholesale prices of commodities in 1913 are taken as 100.

North Atlantic Highway Officials' Meeting, Directors Only

The Board of Directors of the Association of Highway Officials of North Atlantic States, recently decided to limit their forthcoming Annual Conference (Feb. 28-Mar. 1), to board members and three or four ranking officials of each member state. A general meeting, open to all engineers, is again being omitted in 1946 because of travel and hotel conditions, according to A. Lee Grover, secretary-treasurer.



★ (Left): Tractor-mounted auger (see circle) worked down the slope, traveling along foreground path each time to access point back up the bank. (Right): The set-out crew wasn't far behind. Straw mulch was placed as planting progressed

Tractor-Mounted Auger

Digs 34,000 Holes for Slope Plantings

Lombardo Brothers dug 200 to 275 holes a day with this unit in landscaping big cuts on Cleveland's Willow Freeway

GRADING of a portion of Route 21, known as the Willow Freeway project, in Cuyahoga County, Ohio, from the Cloverleaf traffic interchange with Route 17 into the City of Cleveland, involves heavy cut and fill sections.

The soil through this area is predominantly silt and as such is especially susceptible to erosive action. The fill slopes are 3:1 and cut slopes over 5 ft. in depth 2:1. Plans for protecting the slopes from erosion required planting with Honeysuckle vines and Locust and seeding.

The grading contract which involved this work is being performed by the Lombardo Bros. Construction Company of Cleveland, Ohio.

Plans required that the approximately 34,000 honeysuckle and locusts be planted on 5 ft. centers, in topsoil-filled pocket holes 18 in. in diameter and 18 in. deep. The excavating of this number of holes, in a period of labor shortage, presented a serious problem, and illustrates the old adage that "necessity is the mother of invention." The contractor adapted a "Speed Digger" post hole auger unit to the task by mounting on a Model K Allis-Chalmers Caterpillar tractor. The tractor operated on a transverse line down the slope. The unit was mounted in such a manner that the hole was drilled in proper relation to the slope.

★ Holes in cut slope, ready for setting plants

★ Note power take-off and other mechanical details

It was possible to excavate from 200 to 275 holes per day in this manner with the actual digging time being only 20 seconds per hole. The greater part of the time was used up in moving and spotting up over the previously placed stake marking the location of the vines.

The unit as used required a tractor operator, a feed man for the auger, and a ground man. It represented a great saving in labor over hand methods of excavation as well as resulting in finely divided excavated material which could readily be blended into the slopes for seed bed preparation. The machine eliminated the human element present when such holes are dug by hand, by obviating the inclination to skimp on required size of hole where the digging is hard.

Research Fellowship Available

The University of Utah will have available a research fellowship of $600 for a graduate civil engineer who is interested in getting his Masters Degree. The work will be primarily research, and has good possibilities of expanding to a permanent position in this work. For further information write A. Diefendorf, Head Civil Engineering Department, University of Utah, Salt Lake City, Utah.

A.S.T.M. to Meet in Buffalo—The 49th annual meeting of the American Society for Testing Materials will be held in Buffalo, N. Y., from June 24 to 28, 1946. The 1946 Spring Meeting of the society will be held in Pittsburgh during the week of Feb. 25 to March 1.

★ A hole complete in 20 seconds. Showing how unit was mounted on rear of tractor. Swivel suspension permits digging in vertical position when tractor is on any degree of slope

★ Recently resurfaced section of the Cuba Central Highway, west of Havana. Many American tourists may soon be traversing this scenic route. These and other photos with this article taken by "Roads and Streets" Editor, Harold J. McKeever, who accompanied the author on inspection of the highway

Cuba Overhauling Central Highway

$10,000,000 repair and resurfacing program in progress on 700-mile trans-island arterial built in 1927-31

By JUAN IGNACIO PLANAS
Eng. C. E.

ONE of the major highway undertakings in this part of the work is the heretofore little publicized program of heavy repairs begun last year on Cuba's 1140-kilometer Central Highway. Older men in American roadbuilding will remember the wide publicity given this project during its 3½-year period of construction beginning in 1927.

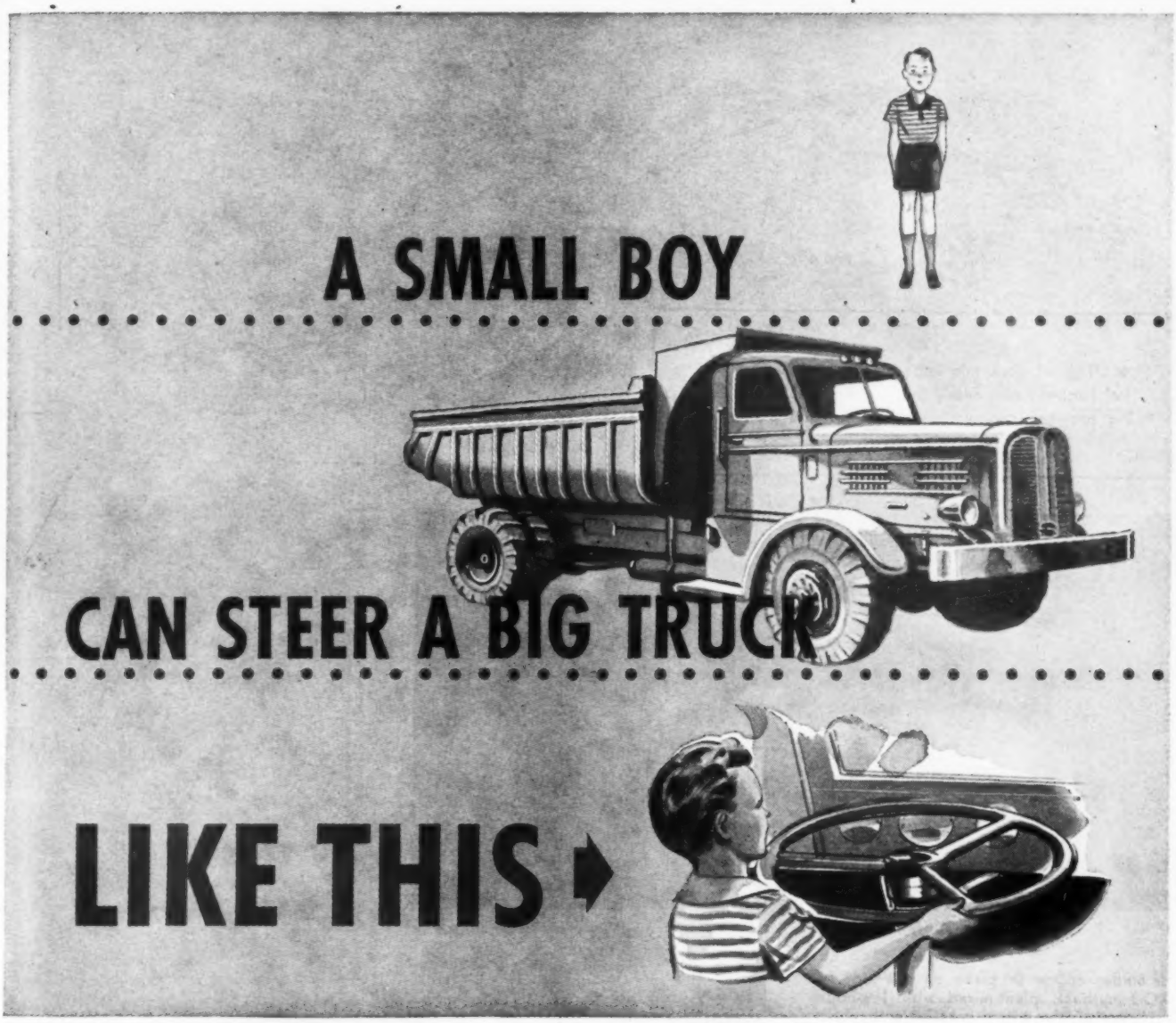
The strategic importance of this road to Cuba can be judged by a glance at the map. Built as a concrete and asphalt paved "spine" to this long, narrow island, it is the connecting link between the Republic's six province capitals. Traffic over the road has never grown to heavy volume except near the highly-motorized Havana area and entering Santiago (east) Camaguey (mid-island), Pînar del Rio (west) and a few other cities. Heavy trucks are relatively few, and growth of trucking has been retarded by the war. Bus travel has grown rapidly, in contrast, buses being depended on for the bulk of inter-city and inter-town travel by a citizenry which finds the railroads slow and infrequent and as yet owns comparatively few automobiles.

All motor travel has been restricted by the tire shortage, which has been more acute in Cuba than in the United States due to the small U.S. export quota.

Original Pavement, Design and Recent Condition

The original pavement is 6½ meters (about 20 ft.) wide, consisting of one-course telford-macadam subbase, a 6-in. concrete base and 1½ in. of asphaltic concrete (Warrenite) surface. The surfacing is flanked by narrow concrete edge strips. Grade and alignment standards quite advanced for that period were followed. All culverts and drains are of concrete and many concrete or steel bridges and grade separations with the parallel-

★ One of the few modern gasoline rollers available, compacting the binder course



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Vickers Hydraulic Power Steering is simple, compact, easy to apply to existing chassis designs. It has automatic protection against abuse and excessive steering reaction forces. Lubrication is automatic. Fifteen years of successful operating experience on trucks, buses, road machinery, etc. have proved the value of Vickers Hydraulic Power Steering. Write for Bulletin 44-30.

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★ Of great economic importance, the 700-mile Central Highway runs nearly the length of the island, linking province capitals, wayside cities and plantations

★ Binder course in place on one side, RC-3 cutback, plant-mixed with 1½-in. max. gravel; the primer is MC-0 cutback, fogged on lightly

★ Mechanical spreaders were used when available on the binder course, invariably on the ½-in. surface course in order to get uniformity

ing Cuban Central Railway were built.

Warren Brothers Co. and the Compania Cubana de Contratistas, S.A., were the contractors on west and east portions, respectively, the original contracts costing approximately $78,000,000 pesos (dollars).

While in general excellent quality of construction was obtained, pressure to hurry the project resulted in insufficient compaction of fills and correction of bad soil conditions on some sections. The concrete base recently failed over extensive areas on such sections, followed by breaking up of the surface. On other sections failed areas were local, usually adjacent to joints in the base. A considerable mileage of the asphaltic surface was found to be in surprisingly good condition after 15 to 18 years of use, this condition reflecting soundness of construction (and was also aided by the infrequent passage of heavy vehicles).

A common type of failure noted was opening up of a wide crack along the center joint, the slabs having become forced progressively apart by infiltrated materials in the absence of tie bars. Other sections built without a center joint developed the usual wandering cracks. Some crazing developed over general surface areas, ranging from light to severe, due to aging of the asphalt.

Repair Program Financed

All in all, it became evident in 1943 that a program of general repairs would be necessary. The repairs undertaken, covering virtually the full length of the road, are the result of a loan to the Cuban government through the Export-Import Bank, United States federal lending agency. The work, to cost about $10,000,000,

★ A wide center crack has been filled with cold mix and rolled, preparatory to priming and salvaging the cracked but still sound asphaltic surface with a ½-in. resurface

★ How ⅝-in. round turnbuckle rods were used to hold broken slabs in restored position. Rods threaded through base of edge strip and across top of base before resurfacing

★ Hand spreading of cold plant-mix for resurfacing

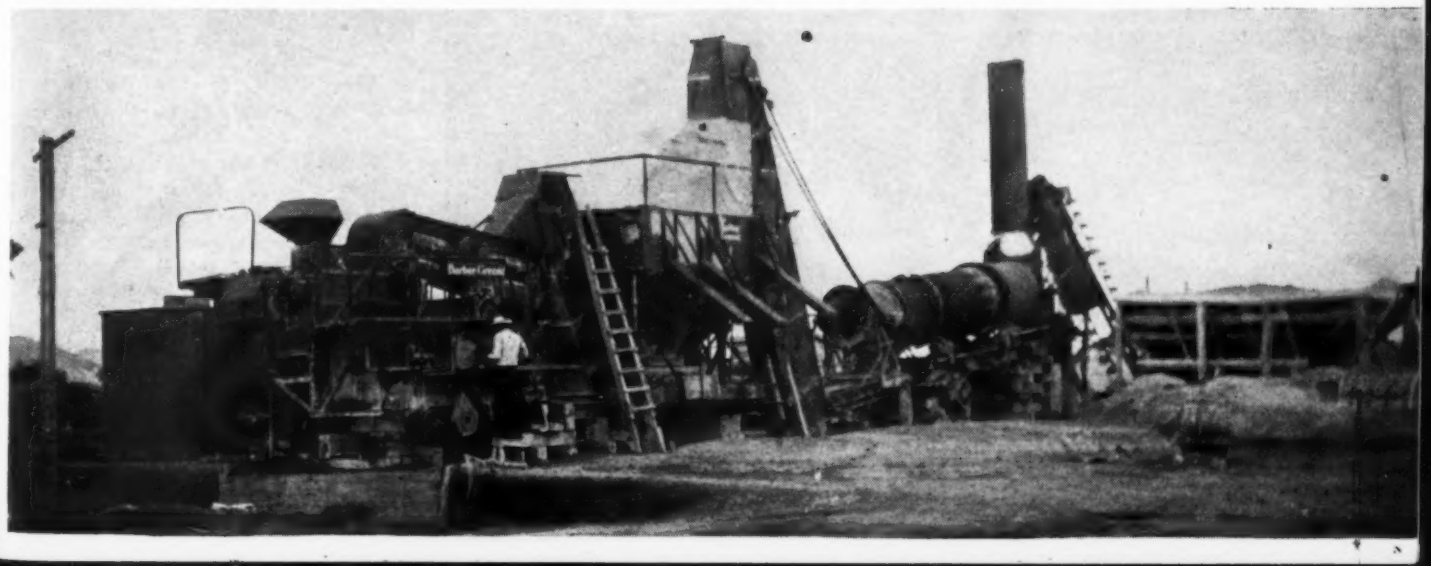
★ One of four asphalt plants employed on the three contracts. Frequent moves helped maintain short truck haul

tors under the supervision of the National Development Commission, with the Frederick Snare Corporation of New York and Havana acting as consulting engineers for the bank.

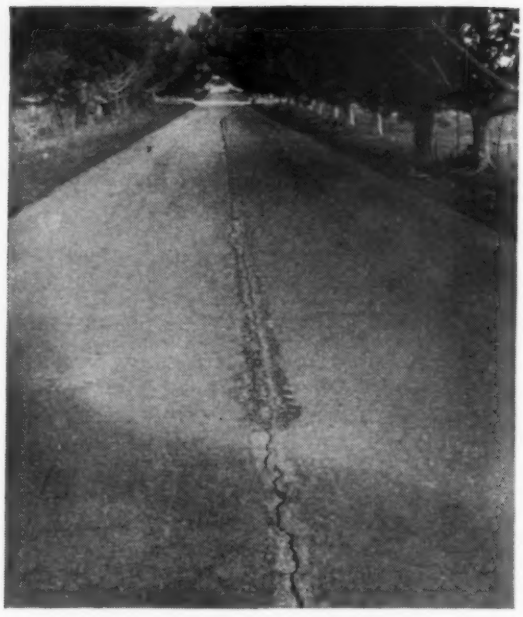
Repair work has been divided into three sections. Eng. Mario Mendoza, succeeding Manuel Lugo Abreu, is contractor on a 455-km. western section Compania Constructora de Caminos, S.A., on a 369-km. mid-portion; Eng. Enrique Garcia Aleman, on 309 km. to the east. Work is scheduled for completion in 1946.

Types and Methods of Repairs

Repairs consist of sealing the medium and large cracks in the concrete base and asphalt surface; repairing the subgrade, including replacement of poor soil and building up where necessary; removing and reconstructing failed concrete base and curb sections; resurfacing where deemed advisable; and repairing and repositioning of guard rail, signs, signals, mile posts, etc. French drains



★ Typical condition of 16-year-old surface prior to repairing. Failure confined to one side denotes probably difference in original mix control or compaction



★ Cracks in asphaltic surfaces less than 4 cm in width were filled with sand-asphalt, broomed in and rolled

are placed under areas of base reconstruction.

Cracks are divided into two general classes as to method of treatment. Medium cracks (under 4 cm.) are filled with a mixture of sand and 6% cut back asphalt (MC-1). Wider cracks are filled with a gravel mix containing ½-in. max. particles and 5% of RC-3 cut-back. The latter is prepared in a mixer (sometimes a concrete mixer) and placed with hand shovels after first cleaning the cracks thoroughly, then rolled with any available equipment (usually an old steamer). Very small cracks have been sealed in some cases by working a mixture of 20% to 25% RC-3 and stone dust into the cracks. This measure hasn't always proved satisfactory, since the mixture is difficult to work in well and comes out soon. Medium cracks were bid at $0.215 per linear meter. Large cracks, $1.22 where they go through the concrete slab, and $0.65 otherwise. If the slab has been raised, filling the crack into the base is $0.88 per lin. meter.

★ Because it prevented free drainage, the concrete edge strip in the original construction is believed to have contributed to surface deterioration in some instances. During resurfacing, slots were cut and shoulders trenched at intervals as shown

★ The Cuban contractors found it economical as well as time-saving to install modern air-drilling equipment for aggregate production whenever obtainable

Removal of failed base and surface is costing $0.31 and new 17-cm. thick concrete base was bid at $4.00 per sq. meter. Hauling away and replacement of unsatisfactory subsoil, $2.76 per cu. meter.

In some places where the concrete base has settled and pulled apart at center joints the slab is being raised to original level and held in place by means of ½-in. diam. steel rods and turnbuckles. The rods are threaded through holes at the raised edges (see photo). Cost per turnbuckle, $6.11. Slabs are held up by forcing select soil, gravel or sometimes mortar is under the edge. Elsewhere sunken slabs are merely covered by a wedge course of cold-mix.

This large scale asphalt work is being supplied along the projects by four modern portable asphalt plants (three-50-ton, one 100-ton). Plant setups are spotted 30 to 40 miles apart to minimize hauling by dump trucks, which have been scarce articles.

Repairing the Surface

Where the surface but not the base has deteriorated the old asphalt is removed, the concrete base cleaned with wire brooms and a tack coat or primer placed. After experimenting to avoid too heavy a prime satisfactory results are being obtained with 0.06 gal. per sq. meter of MC-0 cutback, or 0.18 gals. of Cuban emulsion, FR-1 type.

Then a 1½-in. layer of cold plant-mix consisting of RC-3 cutback asphalt and 1½-in. max. gravel is spread

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Here's an opportunity to utilize that spare heavy-duty truck . . . now "excess baggage" on your hands. Merely purchase the upper structure of a UNIT Crane or Shovel and have it mounted on your truck chassis.* The job can be done easily in your own shop . . . or, if desired, your truck may be sent to the UNIT factory for assembly.

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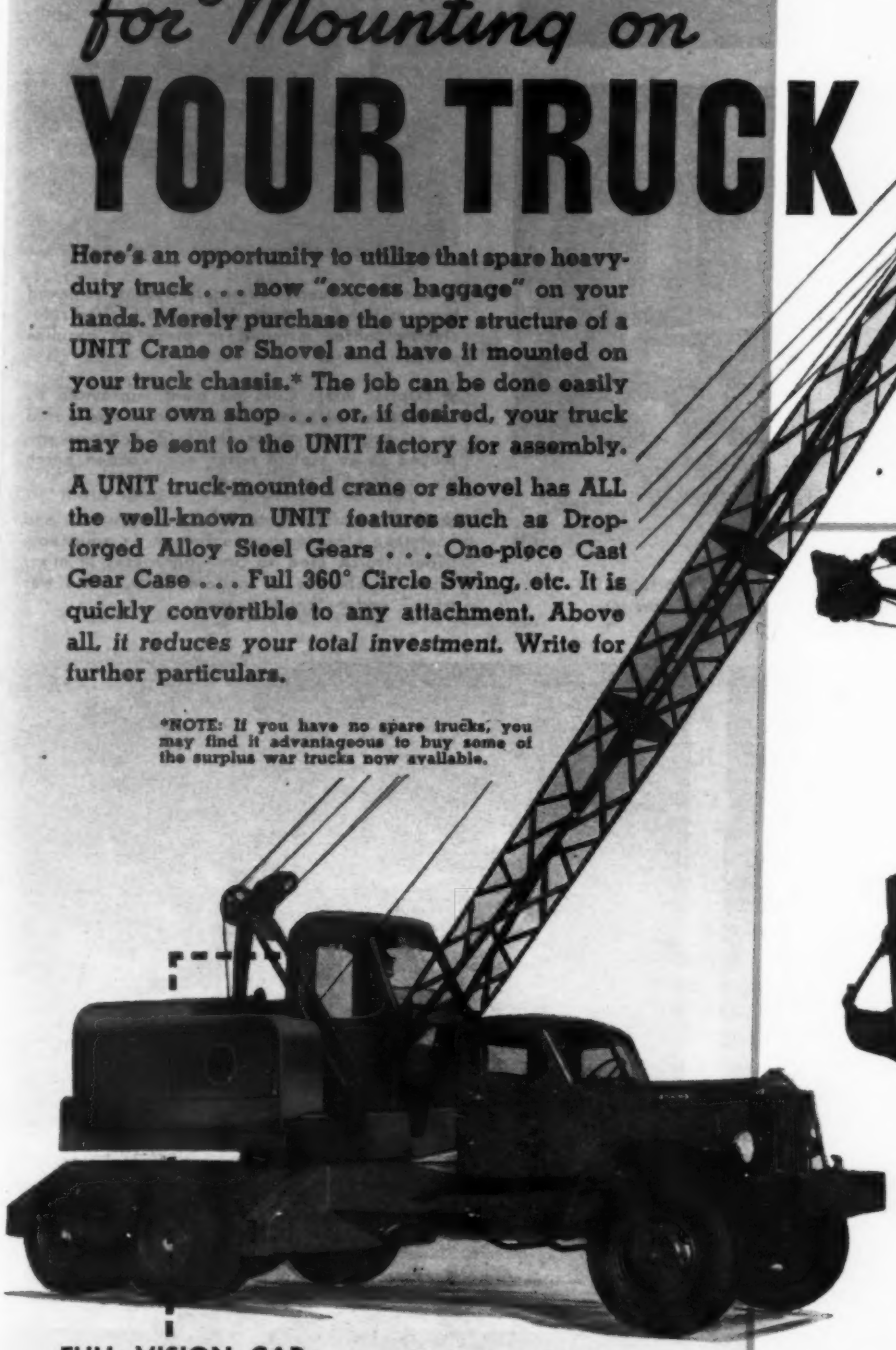
*NOTE: If you have no spare trucks, you may find it advantageous to buy some of the surplus war trucks now available.



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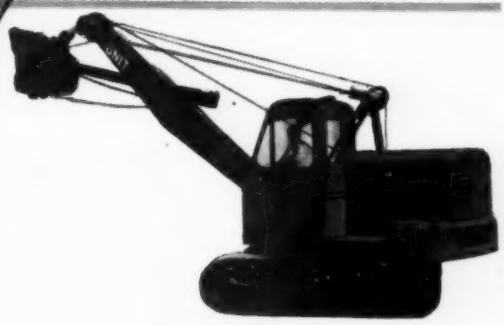

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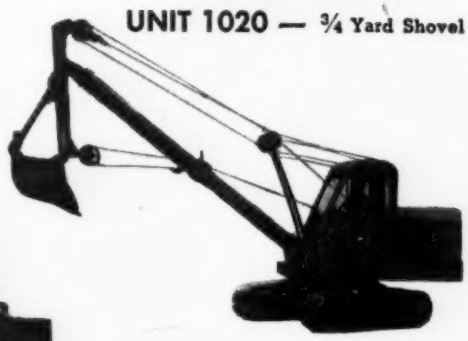

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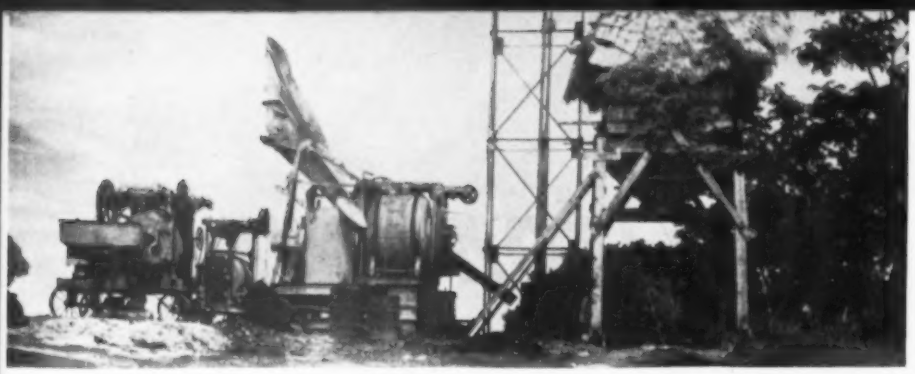

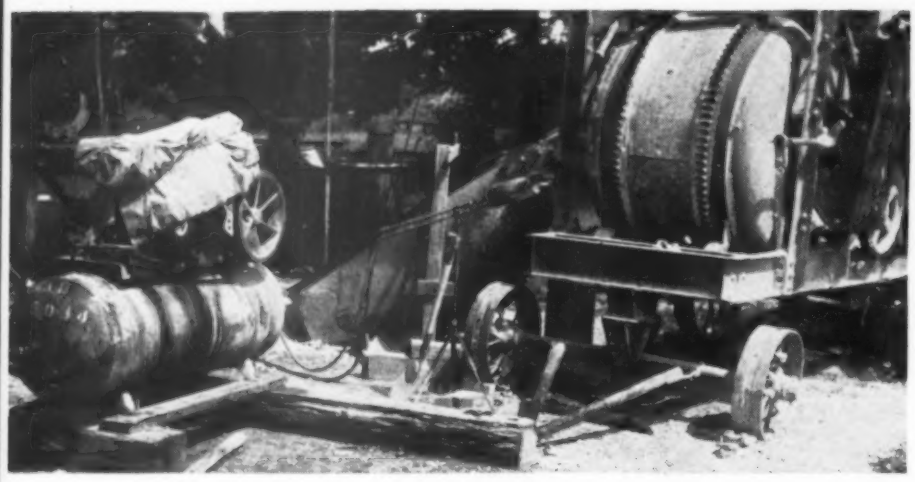

★ (Below): Further illustrating the improvising to meet equipment shortages is this asphalt plant east of Havana, assembled from odds and ends of American equipment

★ Seen in a quarry: Alternate buckets removed in order to adjust stone delivery to desired rate; electric motor installed in place of gasoline power

★ (Upper left): Cold-mix plant improvised by one contractor, consisting of a small mixer used as an aggregate dryer (left), 27-E paver employed as an asphalt mixer, and wooden batch bin loaded via a skip cage

★ (Lower left): Note small compressor, and acetylene blow torch mounted on an adjustable tripod; torch used to dry aggregates in mixer drum. In absence of modern dryer, stone was stored under thatched roof

★ (Below): Modern crushing equipment arrived this past summer. Portable plant being installed to take advantage of a hillside quarry location. Primary crusher shown is being set in a pit below the dumping ramp. Excavation is in progress for a secondary crusher

★ (Left): Shown here are Ing. Juan Ignacio Planas (the author); Carlos Toral, editor, "Caminos y Calles," Chicago; and Ing. Armando Fernandez Mira, representing Frederick Snare Corp.

(usually mechanically), and rolled, followed by a ½-in. surface course of RC-3 and ½-in. max. stone. This resurface is costing $1.20 per sq. meter.

A special feature of the resurfacing program is the quite extensive placement of a ½-in. layer of plant mix over old asphaltic surface which is crazed but in generally good structural condition. The surface is swept, bad cracks filled, and a light prime applied. Then the mix is mechanically applied, consisting of ½-in.-max. material and cutback. Considerable experimentation and training of workers has been necessary to get the best riding surface with this method. The prime must be fogged on the impervious concrete very lightly (0.06 gal. per sq. meter) or bleeding will result. And the spreader crew must be specially alert in order to get a smooth riding surface with such a thin mat.

On one contract the light prime coat was found to be applied more uniformly, with less bunching and bleeding, after lowering the distributor bar 6 in. closer to the pavement, so that air currents under the truck would not disturb uniformity.

Weed Cutting a Problem

No maintenance discussion of Cuban roads is completed without a mention of weeds. Weeds along the pavement grow to car-top heights in a few months or even weeks, clogging drainage and cutting off vision at turns. As one condition for final acceptance the contractor is required to cut all weeds down to the ground and see that ditches and shoulders are properly cleared.

Manual on Portable Pumps Used by Contractors Published by AGC Bureau

A "Contractor's Pump Manual," designed to supply information on portable pumps and guidance to pump users in the construction, mining, industrial and other fields, has been published by the Contractors' Pump Bureau of the Associated General Contractors of America.

Based on the experience of manufacturers regarding the characteristics of the several types of portable pumps, the manual discusses the selection of the proper kind and size of pump for the particular water-moving job at hand, and the correct operation of the pump, together with its maintenance and repair.

Four types of portable pumps are presented — self-priming centrifugal; diaphragms; well-point; road pumps. In each case the pumps are described and their particular advantages and limitations outlined. A pump selection table is included to serve as a guide in the choice of the kind of pump which can be most advantageously applied to the job to be done.

"Pump Trouble Check Sheet" is included in the manual, together with a maintenance timetable; a list of operation "Do's and Don'ts"; tables of useful engineering information and necessary friction tables.

Membership of the Contractors' Pump Bureau comprises the leading manufacturers of contractors' portable pumps in the United States. They are: Barnes Manufacturing Co.; Chain Belt Co.; Jaeger Machine Co.; C.H.E. Manufacturing Co.; Construction Machinery Co.; Marlow Pumps; Sterling Machinery Corp.; Carver Pump Co.; The Gorman-Rupp Co.; Novo Engine Co.

Copies of the manual may be obtained from the Construction Foundation, Associated General Contractors of America, Munsey Building, Washington 4, D. C. Price is 50 cents per copy.

★ How the west portion of Cuba's Central Highway may become a link in the proposed eastern Pan American route to South America

Cuba Central Highway A Link in Pan-American Scheme

Spotlighting Cuba's Central Highway is the recently announced proposal to inaugurate ferry service for motorists desiring to take their cars from Miami to Mexico and down the Central American Pan American highway by way of Cuba.

As shown on the map, the route would include ferry service from Miami to Havana, use of the scenic, palm tree lined Central Highway from Havana 120 miles to Pinar del Rio, and another ferry from an adjacent port to Yucatan peninsula, Mexico. The two ferry jumps would cost a nominal sum ($23 fare, passenger and vehicle) according to plans by steamship companies. The route would be much shorter than a land route from the eastern U.S. seaboard through Central America via Texas and Mexico.

Another more remote future alternate Pan American route is that suggested via Miami and Havana to Santiago, Cuba, and thence by boat to the Caribbean islands and down the eastern side of South America.

The Cuba-Yucatan jump, however, is a serious postwar possibility. It is a route which has long been considered, among other occasions at that of the 4th Highway Pan-American Congress, Mexico City, 1941.

Tar Base Stabilization

as Practiced on Recent Alabama Project

Several tar grades used on traveling plant job planned to make efficient use of available materials; base compacted to 100% relative A.A.S.H.O.

By J. F. Tribble

Asst. Construction Engineer and Bituminous Engineer, Alabama State Highway Department

THE Sand Mountain section of Alabama north of Birmingham, while blessed with rich agricultural soils, is less generously endowed with road building aggregates. In an endeavor to utilize the available material in the most efficient manner the Alabama state highway department planned and constructed a 21-mile tar base stabilization project on Route 63 east and north of Albertville (Proj. S-572 (1) and (2) Marshall-DeKalb Counties).

This road was graded several years ago and a 3-in. loose depth of chert gravel was placed over a 20-ft. width in 1942. Previous to starting the present construction, state maintenance forces furnished the contractor with sufficient material to provide a stabilized base of 6-in. minimum depth after compaction. This necessitated in some sections the removal of considerable rock above subgrade.

Samples of the existing material in the roadway were taken and tested in the department materials laboratory. The average gradation of material to be stabilized was found to be about as follows:

Passing 1" sieve	100%
Passing ¾" sieve	98%
Passing #4 sieve	84%
Passing #10 sieve	75%

The material passing the #10 sieve, which may be considered as binder, contained 36% passing the #200 sieve of which 21% was clay and the remaining 15% was silt.

Tar Application Varied for Test Purposes

The quantity of tar used in the mix ranged from 2.4 to 2.6 gal. per sq. yd., depending upon material gradation for a 6 in. depth of stabilized layer. On the last half of the job, 2.5 gal. was used except for the final 3400 ft. There 1700 ft. was built with 3.0 gal. and 1700 ft. with 3.5 gal. of RT-6 for observation purposes.

The laboratory investigation gave an optimum moisture content of about 12.5% for the untreated soil. However, the addition of the tar reduced the required amount of water to about 11%. The minimum moisture used for mixing was 9%. In most cases there was from 12% to 13% of moisture present in the soil before the tar was added.

The contractor began June 11, 1945, working away from the only shipping point; finished the base Sept. 2 and the double surface treatment Sept. 12.

Scarifying and Pulverizing.—The contractor was responsible for preparation of the soil for mixing with tar. The existing material on the road was broken with a plow and pulverized with a blade grader and a disc harrow. The operations were continued until all lumps of soil had been reduced to half inch or less in size. Stones larger than 2½ in. were removed.

Several Tar Grades Tried

Mixing—Tar was shipped in tank cars from the tar company's plant at Fairfield, Alabama, heated to about 150° F. in the cars on the railroad siding, and hauled in supply trucks to the job. The laboratory investigation indicated that there might be some difficulty in mixing a tar heavier than grade RT-5 so the job was started using tar of that consistency. It was soon evident that a heavier material would be used and the major portion of the job was done using RT-6. One tank car of RT-7 was used near the end of the job. No difficulty was experienced in mixing the different grades with soil under the conditions on this job.

★ Mixing—large capacity traveling plant used

The major portion of the mixing was done with a traveling plant mixer. At the start of the job a small model mixer was used and it was found difficult to get sufficient material through the mixer to produce the required 6-in. depth after consolidation. For the latter part of the job a larger model was used very successfully.

Mixing Methods Using Traveling Plant

In the normal operation the mixer proceeded down the outside edge of one side of the road mixing an 8-ft. width. It returned next to the shoulder on the other side, mixing another 8 ft. This left 6 ft. of unmixed material in the center which was mixed with another 8-ft. pass, lapping 1 ft. on each side. Water was usually added to the loose material ahead of the mixer by means of a gravity-spray water truck.

Arrangements were also made to add water in the mixing chamber if needed. In most cases the water was distributed over the loose material and disced in during the night so that the moisture content would be correct when the mixing began in the morning. By afternoon it was often necessary to supplement the

★ Another view of the traveling mixer in operation

★ (Left): Pneumatic roller helped in the final compaction stages. ★ (Right): Placing tar wearing course. Following a .25-gal. prime, two tar applications were made, consisting of 0.4 gal. with .5 cu. ft. slag per sq. yd.; then .35-gal seal coat plus .27 cu. ft. fine aggregate, rolled

★ (Left): Tar and soil mix—two 8-ft. outer lanes mixed; center 6-ft. lane to be mixed with 1-ft. overlap on either side. ★ (Right): Blading the mixed material—several grades of tar were used for observation purposes

★ Soil prepared for mixing—roadway materials plowed and pulverized with a blade grader and disc harrow

★ Covering the deal coat—slag graded between ¾ in. and No. 10

moisture in the soil by adding water in the mixer. The mixer traveled at the rate of 16 ft. per min. and it was not difficult to mix over a half mile of 22-ft. road in a day. The mixing of the entire road was done in about 50 working days from June 11 to Sept. 2.

Consolidation—As a preliminary to the actual consolidation the coated material was usually aerated by mixing with a disc and a motor grader so as to have uniform moisture conditions from top to bottom. About 2 in. depth of loose top material was piled on one side of the road, and the material thus exposed on half the road was consolidated with a sheepsfoot roller unit. The blade grader continued operating to remove the sheepsfoot marks, aided by a rubber-tired roller at times. If the material became dry, water was added during the consolidation. The base was compacted until 100% relative A.A.S.H.O. maximum density had been obtained.

At this point the top 2 in. of loose material piled on the un-consolidated side was moved over on the compacted half of the road, along with an additional 2 in. of material from that side. The other side of the road was then compacted in the same manner. This compacted surface was sprayed with water to assist in forming a bond between the layers and the loose material remaining distributed with the blade grader and compacted with rubber-tired rollers. A template was used to obtain the proper crown and the base was bladed to the proper shape. At this stage of the work the base generally contained from 6% to 8% moisture.

Primed After Several Days

The base was usually left a few days under some traffic before the prime coat was applied. The surface was kept moist to prevent abrasion under traffic. After priming the average moisture content was eventually reduced to about 4% before applying the double surface treatment.

Small areas which were unstable because of excess water were opened and dried by evaporation before the prime coat was applied.

At one time in the early part of the work a very heavy rain fell for two or three days on a section which had been mixed but not consolidated. The water penetrated down through the mixture to the sub-grade. The mixed material was dry for the depth of a few inches on the top but below that was soaked with water. It was necessary to move the material to one side and expose the sub-grade so that the water in the sub-grade could evaporate. Sheepsfoot rollers again compacted the sub-grade prior to replacing the stabilized mixture.

Prime Coat—The same grade of tar was used for the prime coat as for the mix. Tar was applied at about 0.25 gal. per sq. yd., and generally permitted to soak in without cover. In a few places covering material from the side of the road was applied lightly to facilitate passage of necessary traffic.

As a general rule, the prime coat was under traffic for a week or two before the wearing course was placed. While the road was closed to through traffic, local traffic and that traffic incidental to the work was served at all times.

Only 21 ft. of the 22-ft. width of stabilized base was primed during construction operations, conforming with regular Alabama practice. The remaining 6 in. on each side was covered with shoulder soil and apparently thoroughly water-proofed. It will be observed during the winter and the edges given a prime coat if necessary.

Double Treatment for Wearing Course

Wearing Course—The 20-ft-wide wearing course consisted of a double surface treatment using tar grade RT-12 as bituminous material and slag cover.

The first application of hot tar RT-12 was at the rate of .40 to .43 gal. per sq. yd. This was covered immediately with .5 cu. ft per sq. yd. of coarse aggregate (Alabama Highway department 4B slag) which was rolled in place. Grading requirements

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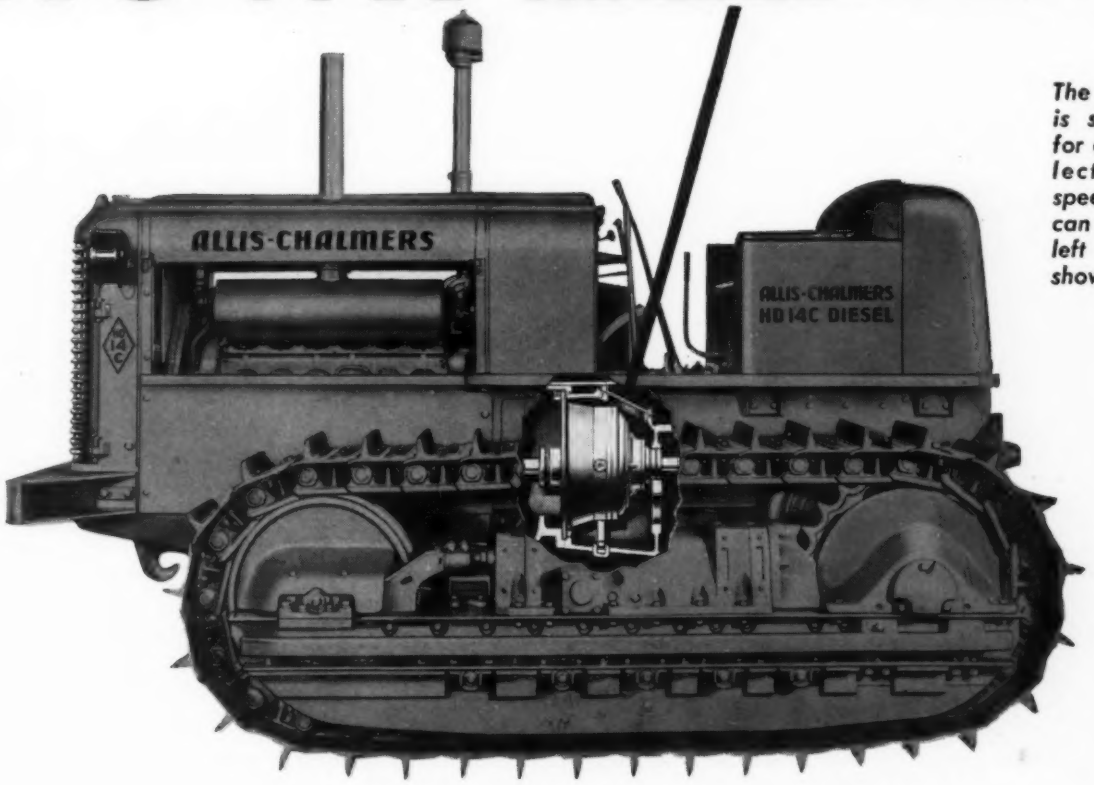

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25% MORE WORK **is accomplished because horsepower output of engine is held near maximum — the torque converter balances tractor speed with load to give maximum operating speed at all times. This means many more yards moved, more miles of roads built.**

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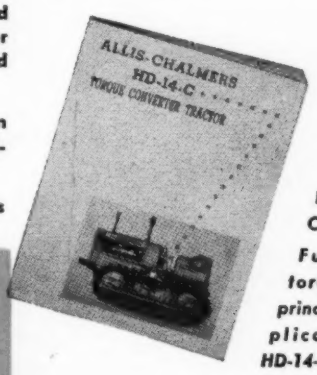
SIMPLIFIED DRIVE —**the torque converter is a simple mechanism, only two moving parts separated by a cushion of oil. In addition, transmission is simplified — three forward speed ranges cover every need, with operation in any gear from zero to maximum — up to 2.89, 3.61, 7.13 m.p.h. . . . to 3.36 m.p.h. reverse.**

You will want to investigate these and the many other advantages of this revolutionary, money-making Diesel tractor. Get all the facts from your Allis-Chalmers dealer.



FREE

Write for this book:

"Allis-Chalmers HD-14-C Torque Converter Tractor"

Fully explains torque converter principle and its application to the HD-14-C.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

Christmas—1945 . . . It's going to be different this year. The war ended months ahead of schedule and it was a glorious Victory. The Christmas star will shine once again over a world at peace. Our boys are coming home and we are thankful for that. So our happiness is best expressed to our many friends by simply saying

Merry Christmas

The Galion Iron Works and Mfg. Co.

Main Office and Works: Galion, Ohio

MOTOR GRADERS **ROLLERS**

★ The finished job—tar-stabilized base plus double tar-and-slab cover, believed to be an excellent solution for this region scarce in local road materials

for the 4B aggregate are as follows:

Passing ¼" sieve	100%
Passing 1" sieve	90-100%
Passing ⅜" sieve	20- 60%
Passing ½" sieve	0- 10%
Passing #4 sieve	0- 2%

This bottom course was left under traffic for a week or so before the seal coat was applied.

The seal coat consisted of from .35 to .38 gallons of hot tar RT-12 per square yard covered immediately with .27 cu. ft. of fine aggregate, Alabama Highway Department 6B slag, per square yard. This was swept and rolled in place.

The grading requirements of Alabama highway department 6B aggregate are as follows:

Passing ¾" sieve	100%
Passing ½" sieve	90-100%
Passing ⅜" sieve	40- 80%
Passing #4 sieve	0- 25%
Passing #10 sieve	0- 6%

The aggregate on the surface was broomed several times until thoroughly imbedded by rolling and traffic.

The construction of this project, in an area deficient in local supplies of road building aggregates, was undertaken only after careful comparison of cost estimates for alternate plans showed that a stabilized base course was favorable economically.

The work was performed under contract by the C. C. Moore Construction Co., Panama City, Fla.

Supervision for the Alabama state highway department was provided by the main office through Ed. N. Rodgers, acting highway director; J. L. Land, chief engineer of materials and tests; Geo. W. Phillips, chief engineer of construction and maintenance; J. F. Tribble, assistant construction engineer and bituminous engineer. The highway division office at Decatur was represented by S. E. Caudill, division engineer; E. B. Bruce, division assistant for materials and tests; G. H. Grisham, division assistant for construction. H. J. Kernachan was associate engineer and M. C. Davis, resident engineer of project and preparatory work.

Adequate Pay for Highway Engineers Plea of ARBA Head

Salaries of state highway engineers should be raised to levels commensurate with their duties, education and experience and the increased demand for specialized knowledge and training which comes with the new era in highways. This was advocated by Charles M. Upham, ARBA engineer-director, in an address, "The Highway Program Begins a New Era," before the Southeastern Association of State Highway Officials recently at Atlanta.

"While we have most excellent men in the highway profession at this time, the new program demands that the number of efficient engineers be much increased," said Mr. Upham. He held that the quickest solution was to pay adequate salaries, and pointed out that engineers were deserting highway work for other fields because of better pay. An engineering college head had told him that his best graduate engineers were turning to railroading because of compensation. "If engineers are worth that to the railroads, they surely are worth the same to highway departments," he maintained.

Mr. Upham cited a study which showed that in 1929, in 44 states, only 18 per cent of the engineers received salaries of $3,000 or more a year—6 per cent received $4,000 or more—2.6 per cent received $5,000 or more, and only .15 per cent received at least $10,000. In contrast, he referred to the recommendations of the American Society of Civil Engineers which held that all chief engineers should get a minimum of $9,600; principal assistants up to $9,360; division engineers up to $7,920 and lesser jobs in proportion. "It is economy to pay salaries that will attract the best engineers to the highway profession," declared the speaker. "To accomplish efficiently and economically the largest highway program ever known, we must have the best engineers, and in order to get them, we must pay satisfactory salaries. They will have charge of the expenditure of many millions of dollars. Roads are going to cost more in the future than they did formerly. If not administered by the best experienced and qualified engineers, the economic loss will be greater."

Illinois Road Toll Act O.K.'d—The Illinois Supreme Court on Nov. 21 upheld the 1943 superhighway act, setting up a 5-man state commission to construct toll highways. The commission is authorized to issue road bonds and to amortize them with tolls as is done with the Pennsylvania Turnpike.

Meetings Ahead

American Road Builders' Association, Annual Meeting and Convention, Stevens Hotel, Chicago, Jan. 14-17.

•

Wisconsin Highway Conference (County Highway Commissioners and Committee Members Assns.), Schroeder Hotel, Milwaukee, Jan. 15-18.

•

American Society of Civil Engineers, annual meeting, Commodore Hotel, New York, N. Y., Jan. 16-18.

•

Purdue University Road School and Show (32nd Annual), Lafayette, Ind., Jan. 21-24.

•

New York State County Superintendents' Association Meeting, Albany, N. Y., Jan. 23-24-25.

•

Highway Research Board, annual meeting, Oklahoma City, Jan. 25-26.

•

Associated Equipment Distributors Annual Meeting, Edgewater Beach Hotel, Chicago, Jan. 27-31.

•

American Association of State Highway Officials, Annual Meeting, Oklahoma City, Jan. 29-30-31, Feb. 1.

•

1946 Michigan Highway Conference, Pantlind Hotel, Grand Rapids, Feb. 26-27-28.

•

Association of Highway Officials of North Atlantic States, Board of Directors and Delegates Meeting (not general meeting), Hotel Pennsylvania, New York City, Feb. 28-Mar. 1.

CONGRESS SAYS "GO"

TO THE CONSTRUCTION INDUSTRY

$3,000,000,000

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If so, C.I.T. will furnish the money . . . at LOW cost . . . and on long terms. Conserve your working capital by having C.I.T. finance your equipment purchases. Any amount, large or small, handled promptly. Be ready to bid on . . . and handle . . . all the work you can obtain!

ORDER the machinery and equipment you need NOW. Amortize the investment while completing your contracts . . . let the equipment earn money without tying up your operating capital. Combine several purchases, if desired, in one obligation.

Our nearest office will arrange all details or, tell your distributor that you want C.I.T. to finance the transaction. Use this liberal, easy-to-operate method of buying construction machinery and equipment.

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AFFILIATED WITH COMMERCIAL INVESTMENT TRUST INCORPORATED

★ Harrison's shop men assembled the motor, compressor and tank onto this pick-up truck to provide a tire service unit for its big airport fleet

EQUIPMENT MAINTENANCE

This Rig Services Tires Only

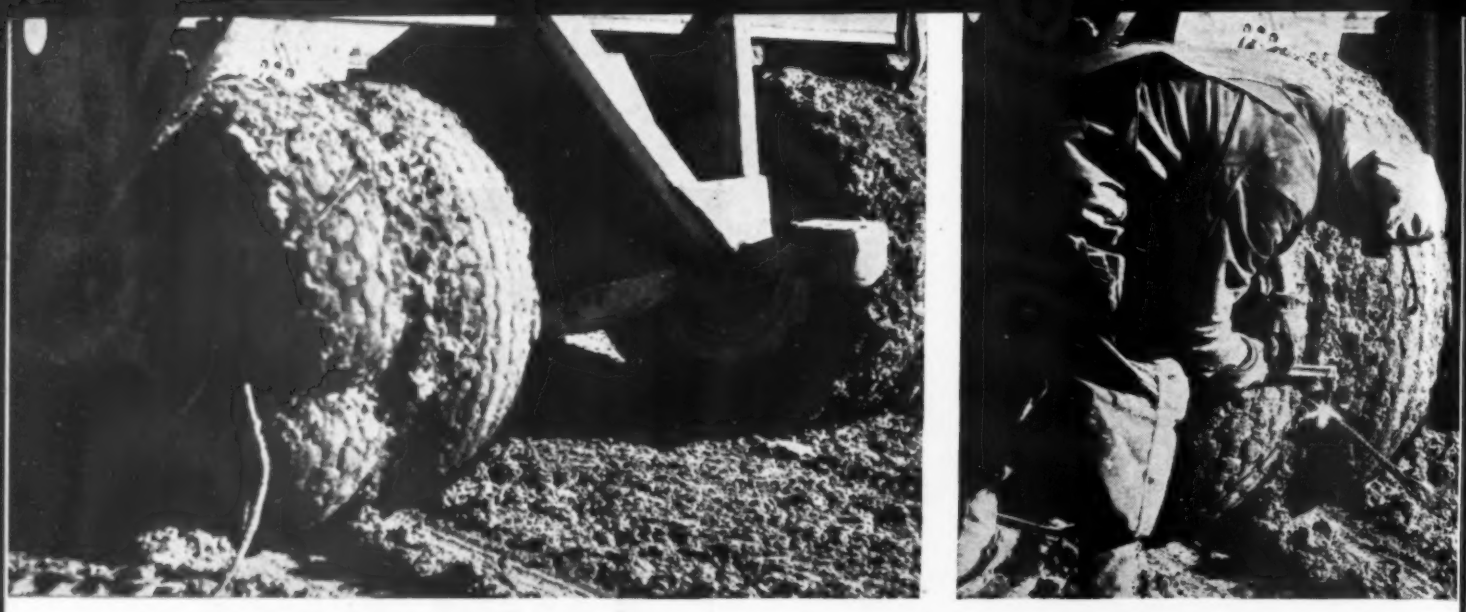
Harrison Construction Company's thousand-odd tires get painstaking attention on this company's 9,200,000-cu. yd. Charleston Airport job.

A SERVICE truck and full-time two-man crew of fellows who do nothing but check, change and fix tires, is one of the most profitable job ideas on Harrison Construction Company's airport grading job at Charleston, W. Va. During the past fifteen months this company has moved some 4,000,000 cu. yd. on a spectacular "mountain leveling" project that will run 9¼ million cu. yd. when completed. Over 200 heavy machines have been engaged in the work, and anyone with a pencil can figure that this means playing nursemaid to probably a thousand pneumatic tires of all sizes.

The Harrison outfit, fresh from another nine-million good earth moving job (Oak Ridge!), has long since learned that it pays to have a crew specially responsible for watching and servicing tires in the field. It isn't merely that scores of thousands of dollars' worth of tires are at stake, but good tire regimen contributes to fast, efficient job operation. A few bad tire mishaps can soon run up delays costing thousands of dollars.

Harrison's tire servicing outfit, first of all, is built around *manpower*, not motors. In charge of tires on this mammoth project is a practical

★ Many of the trucks and other machines get a daily tire checking, by pausing at the tire truck while leaving or enter the shop yard. The tire crew has to chase after many of the machines, however



★WHAT HAVE WE HERE! Just a lesson not to let pieces of broken cable lie around in the ground where scrapers are operating. This scraper tire on Harrison Construction Co.'s Charleston airport job was nearly cut in two by a piece of wire rope, which got picked up and wound around the rear axle after looping over one rear tire. The operator detected the trouble in time, however. A welder with a portable outfit came along with his torch and cut the tangled rope free.

tire man who has been steadily on this work for Harrison for five years. His helper is also a carefully picked man. They aren't concerned with greasing, or anything else. Just tires.

The outfit itself is simple. It consists of a pick-up truck chassis on which is mounted a gasoline motor for powering a small compressor, and a compressor unit with pressure tank similar to such units often seen in stationary installations around automotive service stations. Tire changing tools are also carried, along with three 12 x 12 timber blocks and several 6 x 6 blocks for shoring up scraper and other heavy tires in the field.

The service unit is stationed a good part of the day at a point adjacent to the field repair shop buildings, so that tire pressures can be checked once a day or oftener as the machines come in and out. The first duty is to check all tires systematically "by the book", following tire manufacturer's recommendations to the letter on pressures for a given service and operating condition. While pressure charts are referred to constantly, there is still plenty of need for exercising judgment in varying pressures to allow for tire condition, kind of service and loads carried.

The tires that the crew isn't able to catch while stationed in the shop yard are checked by making the rounds over the airport work, checking off each machine at opportune moments.

The truck is a fast one-tonner which can ramble when there is a hurry-call to change a tire that has gone bad. Tires in need of replacing for repair or inspection are often changed after working hours, or during periods when the machine is halted in the field for repairs or other servicing. Big, husky tires that would scare an ordinary man to death, are handled easily by these fellows with the help of blocks and jack equipment, plenty of elbow grease, and a few tricks of the trade.

A tire repair shop with simple equipment for vulcanizing and testing smaller tires is maintained at the field along with a storage shed. Major tire repair work, such as the vulcanizing of big scraper tires, is handled in the company's headquarters shop at Pittsburgh.

Suggestions For Care of Your Tires

THE following tips for proper checking and maintenance of tires are given in Gulf Oil Corporation's booklet "Lubrication and Maintenance Guide for Contractor's Equipment." Many of these suggestions will seem obvious and "old stuff," but there is many a slip between the cup and the lip, as the old saying goes. The main thing, on a project of any size, is to have a proper set-up and a good man assigned to tire checking and held responsible for that job.

Removing the Wheel:

1. Make sure vehicle will not move when jacked.
2. Block one wheel, front and rear.
3. To loosen nuts, face rear of vehicle and pull up.
4. On soft or uneven ground, use a board as a base for the jack.
5. Jack the wheel up not more than 2".
6. Always use a safety block or rigid jack.
7. Hold foot against bottom of tire and keep hand on tire when turning it around.
8. Spread your feet wide apart, with your back to the wheel, when you lift the wheel clear of the bolts.
9. Put a small amount of heavy grease on each bolt so that nuts will go on again easily.

Replacing the Wheel:

1. Before replacing the wheel, check tire pressure with a gauge, check valve for leakage, and replace valve cap.
2. When working alone use shovel or bar to lift the wheel so that wheel nuts will center.
3. When tightening nuts always face toward the front of the vehicle and pull up.
4. Tighten nuts one at a time—first one nut, then the opposite nut—not one after another.
5. Draw wheel nuts up as tight as possible. Be sure that they are

tightened evenly. Tighten again after an hour's operation.

6. With dual wheels, tighten inner wheel stud nuts as tightly as possible before outer wheel is applied.

7. Mount dual wheels with ventilating holes in each wheel lined up together to permit free flow of air.

8. Keep valves on dual wheels directly opposite so that they may be easily located even in the dark if necessary.

AMOUNT OF WATER AND CALCIUM CHLORIDE TO FILL EACH TIRE THREE-FOURTHS FULL

Tire Size	Water Only		CALCIUM CHLORIDE ANTI-FREEZE SOLUTION SAFE FROM FREEZING TO 20° BELOW ZERO			SAFE FROM FREEZING TO 40° BELOW ZERO		
	Gallons	Pounds	Gallons Water	Pounds* Calcium Chloride	Weight of Mix	Gallons Water	Pounds* Calcium Chloride	Weight of Mix
5.00-15	2.88	24	2.6	5.5	27.1	2.45	8.7	29
7.50-10	4.8	40	4.4	9.1	45.7	4.1	14.5	48
9-38	24.6	205	22.5	45.8	234	20.9	74.2	248
10-38	31.2	260	28.6	59.3	298	26.5	94.2	315
10-26	22.2	185	20.4	42.2	212	18.9	67.0	224
11-16	31.2	260	28.6	59.3	298	26.5	94.2	315

*A heaping quart of Flake Calcium Chloride weighs approximately 2 lb.

Preventive Maintenance:

1. Spare tires should be stored away from sun, light, and oil. The best place is a cool, dry, clean basement.

2. Careful driving means avoiding fast stops and starts. Drive at conservative speed. Slow on curves. Avoid stones, curbs, and holes.

3. Proper mechanical condition of the truck saves tires.

4. Check clutch, brakes, wheel alignment, axles, wheels, and rims for mechanical irregularities.

5. Chains should be used only when needed and removed as soon as the need is over. Chains that are too tight or improperly applied dig into tires; loose chains may catch on the vehicle.

6. Overloading is dangerous, since it flexes the tires excessively, causes heat, and the tires weaken and break down, resulting in a "blowout."

7. Dual tires must be properly matched. If one tire carries the whole load, both will soon fail.

8. Match new dual tires together and old tires together. When new and old tires must be matched, put the new tire on the outside.

9. *Keep correct pressure in all tires at all times. This is the most important thing you can do to protect your tires.*

10. Under-inflated tires flex too much, heat, and may blow out. Don't guess at pressure—use an accurate gauge. Over-inflation causes excessive center-tread wear and jolts the driver, vehicle, and load. CHECK PRESSURE EVERY DAY. CHECK WHEN TIRES ARE COLD.

11. Never run on a flat tire. Replace at once. Running flat will probably ruin both casing and tube.

12. Never "bleed" a tire; that is, let air out during or after a run. This makes the tire get hotter—produces "blowouts."

13. Regular inspection to remove tiny bits of metal, stones, and glass will make tires give many more miles of service.

14. Rotate tires regularly, including the spare.

Adding Extra Weight to Rear Wheels of Wheel Type Tractors:

Extra weight can be added to the rear wheels of a pneumatic tired, wheel type tractor when more traction or pulling power is needed. The load, of course, should not be unreasonably heavy.

Extra weight is needed only for heavy pulling—not for light-duty work—or when heavy equipment such as a snowplow or bulldozer is mounted on the tractor.

How Extra Weight is Added: Weight may be added to the driving wheels by bolting cast iron or concrete weights

(*Continued on page* 105)

Acetylene Outfit Carried in Trunk Compartment of Car

Acetylene welding or cutting when needed usually has to be done in a hurry, and it's important to have an outfit that can be "Johnny on the spot" with least delay. The Lane Construction Co., Meriden, Conn., has an outfit, consisting of acetylene equipment stowed in the trunk compartment of an automobile.

This outfit doing its stuff is shown in the accompany photographs on the Wilbur Cross Highway contract west of Hartford. Here a bulldozer cable had become worn and finally had snapped. The repairmen got word from a passing truck and in a few minutes were on the scene. In this particular instance it was decided to buttweld the cable break in order to draw the worn cable through the machine. One scene shows the welder applying his torch, which was done until about 2 inches of cable had been fused into a solid mass. The repairmen then wrapped a wire collar around the burst and frayed cable area just to one side of the weld, so that it would hold until threading through the machine.

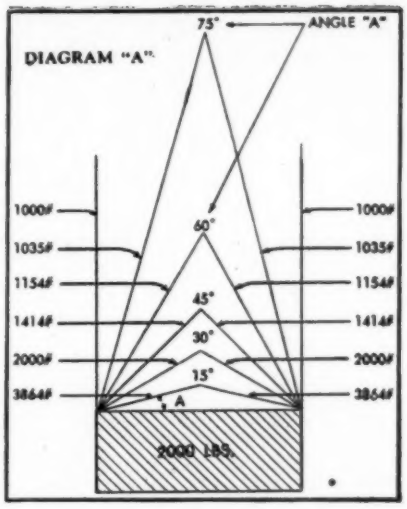
Rope and Knots

Rope is very important to the construction man. It is one of the tools he uses every day. Proper care and use of it makes work easier and safer.

With the wide importance of rope in mind, we present this article which appeared in "The Line," published by Line Material Company. It has been prepared to briefly cover some of the more common knots and care concerning rope which the road construction man would be interested in.

Where ropes are used for hoisting, they are continually bending as they go around pulleys, this causes chafing of the strands and consequently wear. In order to minimize this, it is well to use a pulley not less than 8 times the diameter of the rope when hoisting and if power is to be transmitted, a pulley not less than 40 times.

When knots are tied in rope it is weakened due to the bending of the rope which places most of the strain on the outer fibres. The knot which has the least weakening effect is the one that requires the least abrupt bending. Table I shows the approximate percentage of strength left in a rope after one of the class of knots listed has been placed in it. Other knots can be estimated by comparing them with those listed.



The strength of rope is figured for a direct pull. If it is to be used as a sling or lashing where strain is placed on the rope at an angle, the strain in the rope is increased according to the angle as shown on Diagram A.

From this diagram the load at other angles can be estimated for each 2,000 lbs. of weight. If possible, never use slings at less than 45 degrees.

TABLE 1

	Efficiency of Knot (per cent)
Straight rope	100
Eye splice over an iron eye	90
Short splice	80
Timber hitch anchor bend	65
Clove hitch running bow-line	60
Square knot	50
Over-hand knot	45

In order to get the maximum service and safety out of rope the following suggestions are made:

Dont' allow rope to kink.

Don't drag rope on ground. Dirt chafes fibres.

Don't let rope slip on winch drums or lie idle on a moving drum.

Don't use too small a rope or sheave.

Don't use sheaves with rusted or rough surfaces.

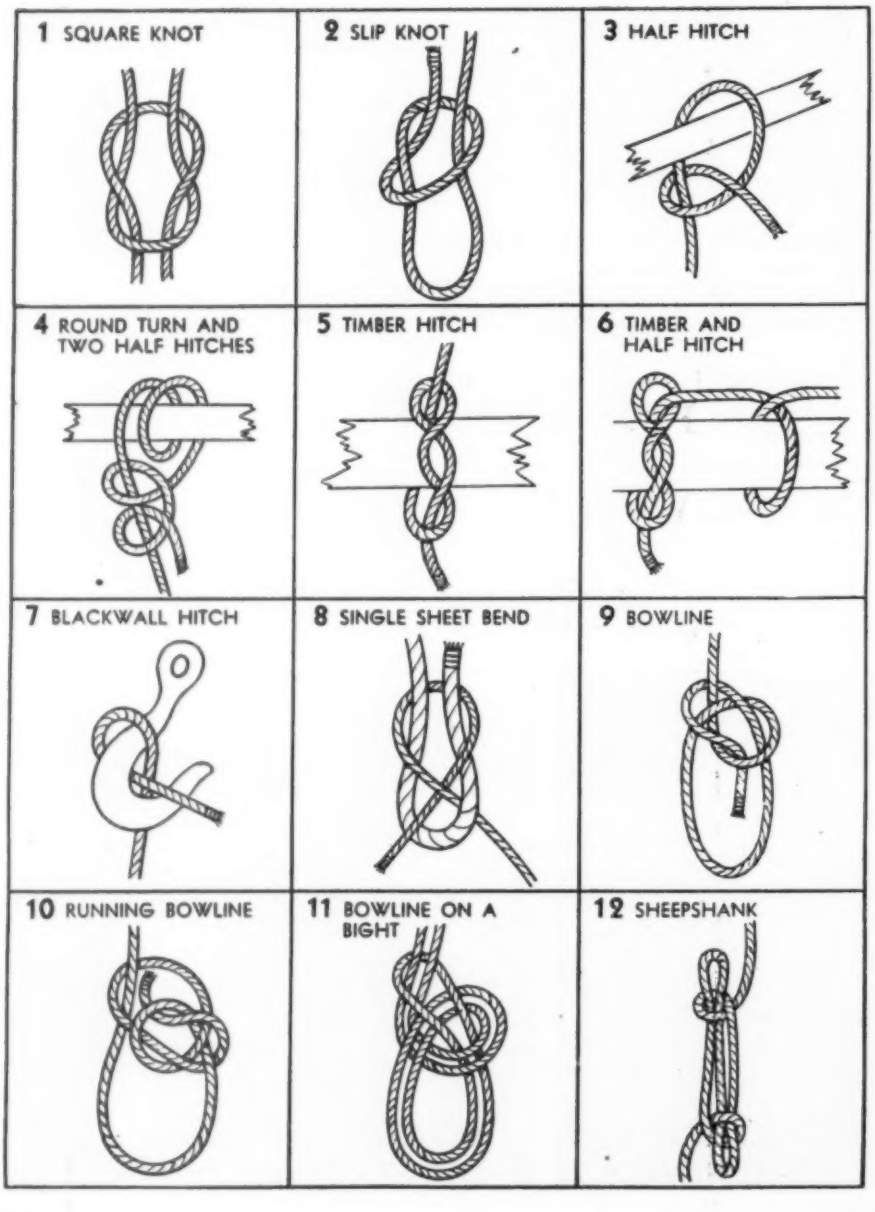
Don't allow a rope to unlay. Finish the ends.

Don't dry a rope on steam pipes or near excessive heat.

Don't tie knots where splices should be used.

Examine strands frequently for breaks and internal wear.

A series of sketches are shown which illustrate the make-up of knots commonly used by road construction men.



(*Continued from page* 103)

to the wheels. However, the most common practice and the most economical is the use of liquid in the tires.

First, secure an adapter from your dealer and attach it to the tire valve. Then, after jacking up the wheels or placing the tractor on blocks, fill the empty tire about ⅝ to ¾ full with water. This is done by (1) connecting a hose direct from the pressure water system to the tire valve; (2) draining water through a hose from a barrel or tank elevated 5 feet or more above the upper level or the tire; (3) forcing the water into the tire with a pressure hand pump or pressure tank.

Protection against freezing can be obtained by adding proper proportions of calcium chloride. It does not deteriorate rubber and dissolves readily in water. See accompanying chart.

According to leading tire manufacturers, no objectionable effects are encountered when a liquid weight is used at tractor speeds as high as 20 miles an hour.

OTC
MAINTENANCE
TOOLS
PE-15 Maintenance Set includes necessary OTC TOOLS for repair work on track-type tractors, Diesel motors and all types of road maintenance machinery.
CUT DOWN
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Repair jobs on road machinery are speeded up SAFELY—on the job or in the shop—with the portable OTC PULLING SYSTEM. It removes and replaces gears, bearings, sleeves, wheels, shafts and other close-fitting parts—easily, quickly and without damage. A set of OTC PULLERS will pay for itself on one job, in time saved alone. Approved by Hyatt, M-R-C, New Departure, SKF and Timken for use in pulling and installing their bearings.
OTC GRIPOMATIC PULLERS, PUSH-PULLERS, Pulling Attachments and Adaptors, BOX WRENCHES and other tools are made in sizes to handle practically every maintenance job.
Write for OTC Maintenance Bulletin showing some of many time-saving uses of OTC TOOLS.
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A.E.D. Annual Meeting

Surplus property disposal, remaining governmental wartime restrictions, and postwar problems to feature 27th annual meeting of equipment distributors

The Associated Equipment Distributors (A.E.D.) is expecting a record attendance at its 27th Annual Meeting, Edgewater Beach Hotel, Chicago, Jan. 28-31. This industry, with a war production output of around a billion dollars' worth of heavy construction and roadbuilding machinery, will take stock of its post-war situation and chart its course for serving in the big problem ahead.

Nationally known leaders of thought in industry and in government will discuss these topics: Orderly absorption of vast quantities of surplus heavy construction machinery and equipment (concerning which there has been considerable confusion, misunderstanding, duplication of authority and other factors disturbing both to the industry and governmental functionaries involved); and problems incident to continued exercise of government restrictions; and plans for full execution of A.E.D.'s program to provide "new and constructive opportunities for returning veterans," etc.

A.E.D. President H. O. Penn of New York, will preside. Program Committee is under the chairmanship of Executive Vice-President F. B. McBath of Portland, Ore. Executive Secretary Carol F. Winchester states that registration of those authorized to participate in the Association's forthcoming Annual Meeting will be restricted entirely to A.E.D. members.

N. Y. C. Plans $285,000,000 for Roadways

New York City's huge postwar parkway and highway program was again lime-lighted by Robert Moses, chairman, Triborough Bridge Authority, in a news report stating that over one-third of a $285,000,000 3-year program is represented in projects now ready or soon ready for letting. Five great projects for the first three years are The Cross-Bronx Expressway, $38,670,000; the Van Wyck Expressway, servicing Idlewild Airport (Queens), $13,250,000; the Brooklyn-Queens Expressway, $15,800,000; the Bronx River Expressway, $7,180,000; the Deegan Expressway (Bronx), $25,070,000.

Tips on Cold Weather Starting

Reprinted from the Ford Truck Operators Manual (1945), this advice is good in general for any make of truck on a frosty morning

Where temperatures from 10° F. below zero to 65° F. below zero prevail, dilute the engine oil by adding 1 quart of gasoline. This gasoline should be added while the engine is still warm. Stop the engine and add oil of S.A.E. 10 or 10W viscosity up to the FULL mark. Then add 1 quart of gasoline. This will bring the level of the oil higher than normal. This level should be marked on the gage for future reference. The presence of a large percentage of light diluent will increase oil consumption, and for that reason the oil level should be checked frequently. If the vehicle is operated 4 hours or more at operating temperature, redilution will be necessary if it is anticipated the vehicle will be left standing unprotected for 5 hours or more. This can be accomplished by adding oil of S.A.E. 10 or 10W viscosity to the FULL mark, then adding gasoline to the dilution mark on the gage described above. Start the engine and allow it to run for 2 minutes to assure mixing of the oil and gasoline. This mixture will have a very low viscosity for each starting, and the gasoline will vaporize and pass off very quickly when the engine is running, leaving the oil at its original viscosity.

Cold weather starting problems are always the result of poor preparation or maintenance of the vehicle, and in addition to the causes of failure to start, they can be attributed to either the engine oil being too heavy for the temperature encountered or the battery being low in charge.

25 Cities Completing Master Airport Plans

More than 25 progressive American communities, aware of the value of sound planning for the future, have completed or soon will complete their master airport plans, according to Edgar Smith, Director of the Airport Plans and Survey Service of the Civil Aeronautics Administration.

Metropolitan and regional airport studies which have been completed or are nearing completion are: Boston, Providence, New York, Philadelphia, Rochester, Syracuse, Atlanta, Birmingham, Miami, Nashville, Chicago, Cleveland, Detroit, Indianapolis, Minneapolis-St. Paul, St. Louis, Dallas, Fort Worth, Houston, Omaha, Los Angeles, Seattle, Milwaukee and Newport News.

These plans are not for the central cities alone; they include in each case, the contiguous metropolitan **area**. Boston's plan for instance, covers six counties and one hundred towns; the New York plan deals with 22 counties in which lives 10 per cent of the population of the United States; Washington's plan takes in not only the District of Columbia, but five adjoining counties in Maryland and Virginia.

With an estimated 400,000 airplanes of all types in the United States within ten years, of which only about 1,200 will be aircraft for scheduled transport operations, a tremendous planning problem is confronting every metropolitan area. During the war there were only about 350 transport planes used on all domestic airlines combined.

A recent study including a large city and eight adjacent counties revealed that there would be a need for 41 airports. Two would be required for major scheduled commercial operations, seven for combination feederline and personal plane operations, three for non-scheduled commercial operations, two for Navy operations and the remainder (27) would be needed for personal plane use.

Making detailed surveys, arranging for funds and other preliminaries will require an estimated 12 to 18 months after the expected passage by Congress of some form of the National Airport Plan. The sort of planning currently being done by these 25 cities will materially shorten this waiting period.

Some community plans have been made by Planning Commission staffs; in other instances consulting firms have been retained for this purpose. Both local officials and private consultants have benefited by the Airport Advisory service furnished by the CAA. Regional CAA offices are located conveniently throughout the United States; in addition, the Office of Airports in Washington maintains an Urban Planning Section which is always ready to help local officials get started along the right line.

Hard-Facing Saves $19.00 Roller Replacements

Generally a one-pass layer of Coast Metals is all that's needed to restore original dimensions. Where rollers are badly worn, first build up the surface almost to finished size with mild steel.

THE NEXT TIME your double-flange tractor rollers become badly worn, try reclaiming them with Coast Metals Hard-Facing. Not only will the cost of new rollers be saved, but delays in getting replacement parts are avoided. Idle labor is reduced to a minimum. One company reports a replacement saving of $19.00 for each roller reclaimed as well as other savings. Coast Metals Hard-Facing is extra-resistant to wear and abrasion of dirt and sharp sand. Technical Pamphlet 201 goes into detail. Write for this today.

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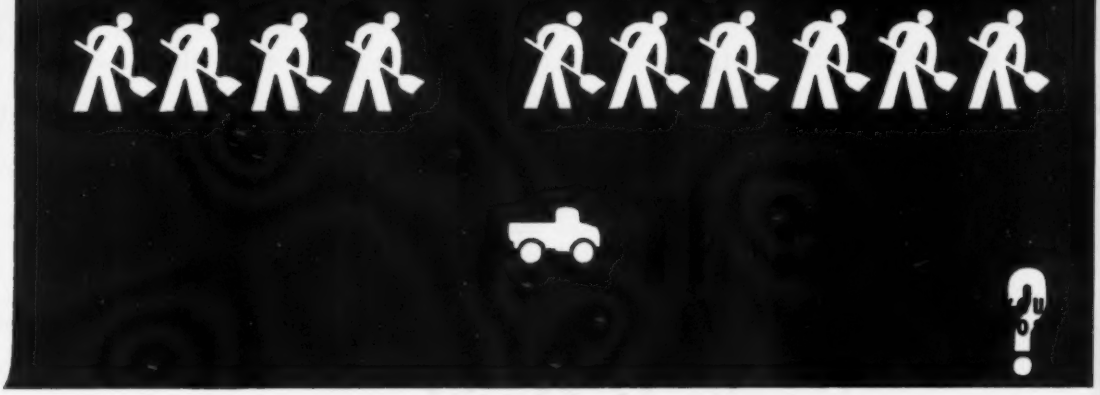
hard-facing weld rods
MAKE YOUR EQUIPMENT LAST LONGER

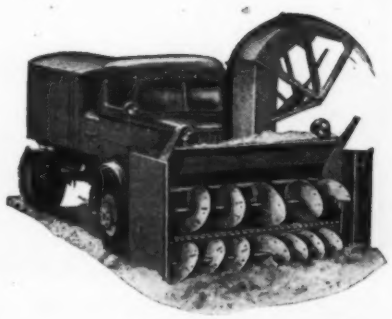
in **10** *minutes*



* *Name of Municipality on request.*

Your municipality can Soon Save the cost of

SICARD SNOW BLOWERS



Sicard Snow-Blowers have been demonstrating, since 1927, that snow and ice removal ceases to be a problem of cost, crews or conditions, when Sicard's versatile blowing, loading and scarifying features are available.

In the matter of costs, the long service life of a Sicard Snow-Blower (every Sicard Snow-Blower ever built is still in use) returns your investment in the form of labour costs saved and improved service to your community.

SNOW BLOWERS

Stepped-up production ...Thanks to Mack!

WITH so many orders to build air fields and defense highways, Stewart & Nuss, prominent California contractors, were faced with a supply problem. Limited area of operation restricted the number of trucks carrying paving material, thus slowed down production. How was this "bottleneck" broken? By the purchase of two diesel-powered, extra-large-capacity Macks! Operating full time, with their 15-ton loads, these Macks enabled the contractors to more than meet production demands. And so satisfied were Stewart & Nuss, that they are already planning additional purchases of Macks! . . . There is always a Mack to meet any particular problem!

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ONE TON TO FORTY-FIVE TONS

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Mack Trucks, Inc., Empire State Building, New York 1, N. Y. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts.

Improving
Engineer-Contractor Relationships

By H. K. Glidden
Assistant Supt. of Airways, First Region,
Civil Aeronautics Administration,
New York, N. Y.

1—Steps in a plan by which a supervisory employee can improve his handling of problems on the job

THE skills involved in handling any type of a problem can be learned. The experience of successful men in getting the answers, provide a wealth of information which is available to every engineer if he will take time to hunt it out. Recent studies in supervisor-employee relationship, while not made for the purpose of devising methods for improving engineers, have delved deeply into the methods employed by numerous successful men in handling a variety of problems. It is believed the findings of these studies properly applied to the engineers' problem provides the basis for developing a plan which will work to the engineers' benefit whenever it is followed by him.

The U. S. Civil Service Commission in its courses in "Job Relation Training" uses a card which has printed on one side of it the four steps of a plan for handling an employee-supervisor relationship problem where the supervisor must take action. The plan was developed from the studies referred to and is as follows:

I. GET THE FACTS

(a) Review the record.
(b) Find out what rules and customs apply.
(c) Talk with individuals concerned.
(d) Get opinions and feelings.

Be sure you have the whole story.

II. WEIGH AND DECIDE

(a) Fit the facts together.
(b) Consider their bearing on each other.
(c) Check practices and policies.
(d) What possible actions are there?
(e) Consider effect on individual, group and production.

Don't jump to conclusions!

III. TAKE ACTION

(a) Can you handle this yourself?
(b) Do you need help in handling it?
(c) Should you refer this to your supervisor?
(d) Time your action properly.
(e) Don't pass the buck.

IV. CHECK RESULTS

(a) How soon will you follow up?
(b) How often will you need to check?
(c) Watch for changes in output, attitudes and relationships.

Did your action help production?

In their presentation of the plan to Government supervisors, the U. S. Civil Service Commission points out that the plan they have adopted is applicable to the solution of almost any problem. They point out the very close proximity of the method followed by a doctor in solving the problem presented to him by a patient's illness to that which they have set up for handling job relations. The analogy is also carried to methods employed in other professions such as law, engineering and journalism.

Previously in this article, I have pointed out that engineer-contractor relationships in most instances can be improved and have expressed the opinion that this can be accomplished best by improving the engineers and the engineering profession as a whole. My suggestion for improving these relationships involves the use of a similar plan by all engineers.

I expect to encounter the same reaction from engineers as is found in supervisors when they are presented with the foregoing plan to follow in carrying out a job they have been doing previously. The majority of supervisors appreciate being instructed in the use of the plan, and feel it helps them to develop skill in performing their job. A fair percentage state that they knew all of that stuff before, and that they don't need any plan. My observation is that the supervisors who feel they know too much to profit by applying the plan are often the ones who have the most to gain from it. Whenever I find myself in trouble, either as a supervisor, an engineer or as an individual, I can check back over the four-step method and usually spot the place I failed to get the whole story, jumped to a conclusion, passed the buck or neglected some part of the plan and, therefore, failed to do as well as I would have if I had followed the advice I am giving here. I am, therefore, presenting my revision of the four-step method, changed to apply specifically to engineering problems, with a good deal of confidence in its ability to improve engineers. I feel that I can present it as a tried and proven method. For the engineering professions' purposes let us consider a problem to be "any project or portion thereof assigned to the engineer for accomplishment," and look over its solution when the following method is used:

★ The contractor is no angel either

Editor's Note: *This is the second section in an unusual paper which we believe every engineer, contractor and job superintendent will find profitable reading. The series is the more interesting because the author has "been through the mill" on construction and speaks from practical experience. Further installments will elaborate on the steps of weighing and deciding issues, and of taking action on important job decisions.*

I. GET THE FACTS

(a) Perform an accurate detailed survey.
(b) Review the record.
(c) Find out what rules and customs apply.
(d) Talk with individuals concerned.
(e) Get opinions and feelings.

Be Sure You Have the Whole Story!

II. WEIGH AND DECIDE

(a) Fit the facts together.
(b) Consider their bearing on each other.

Rugged Enough FOR THE DIVE BOMBER

VICKERS HYDRAULIC CONTROLS

ALSO make Construction Equipment MORE DEPENDABLE

When a dive bomber pilot pointed the nose of his plane at the target and began that lightning-like dive, his life and hitting the target depended on the plane's controls. Vickers produced the dependable power hydraulic controls which, in spite of difficult weight limitations, met these exacting dive bomber standards. Vickers also produced dependable controls for many other types of important war implements.

Dependable controls are vital in construction equipment too. While life and the turn of battle do not depend on them, many other factors of importance do.

Vickers Power Hydraulic Controls for construction equipment have the same dependability which met the crucial test of battle in war machines on every front. These controls will take all the smashing, pounding shocks that construction equipment must withstand. They are simple, flexible, inherently self-lubricated, rarely need maintenance . . . assure immediate response to "finger-touch" on the operating lever, no matter how heavy the job.

Specify Vickers Power Hydraulic Controls . . . and get the most modern, fast-working construction equipment.

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ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

(c) Check practices and policies.
(d) Determine all possible actions.
(e) Consider effect of each possible action on the owner, user and production.
(f) Decide on action to be taken.

Don't Jump to Conclusions!

III. TAKE ACTION

(a) Can you handle this yourself?
(b) Time your action properly.
(c) Should you refer this to your supervisor?
(e) Don't pass the buck.

IV. CHECK RESULTS

(a) How soon and how often will you follow up?
(b) Watch for changes in output, attitudes and relationships.

Did Your Action Help Production?

Prior to attempting to solve the problem at hand, the engineer must determine the objectives he expects to accomplish by the action he finally takes. His objectives may be very clearly defined for him by the owner or he may have to determine them himself. In every situation the entire process of solving a problem will be simplified if the objectives to be accomplished are clearly set forth in some written form. In deciding on the objectives, always bear in mind that their relationship to the owner, the user and production is extremely important.

I believe it can be shown that an engineer can profit by applying steps I, II and III of this plan to the problem of getting any project to the point of awarding a contract. Step III will also be of use to him after the project is under construction. Step IV is intended to cover the engineer's method of evaluating the benefits to himself resulting from his use of the plan outlined herein. Step IV at the same time is part of solving the problem, as it is necessary for the engineer to follow up on the previous steps, particularly Step III.

Step I—GET THE FACTS

It is the writer's observation that the engineer's failure to painstakingly carry out Step I is the biggest mistake he can make. All engineers have in every instance used some part or all of Step I, largely because it is practically impossible to get a job done without some facts. It is, however, surprising how few facts some contracts are based on. Having a definite plan to follow, and making it a ritual to follow each step of the plan, should assure the engineer of getting all the facts and having a whole story.

LE ROI POWER
flows smoothly into
AIR POWER . . .
with Le Roi portable compressors

Le Roi Engines and Le Roi Compressors make a smooth-running team because they are designed to work together — and both are manufactured to the precision standards of an engine-builder specializing in the heavy-duty field. Le Roi Compressors are the *only* ones in which both engine and compressor are built by the same manufacturer.

These Le Roi features "pay off" in long time, low-cost service

This combination gives you the easy-maintenance features of Le Roi Engines . . . reducing "down-time" and cutting your maintenance costs — the smooth, vibrationless operation — the economical, dependable power that has made Le Roi Engines the standard on many leading makes of construction, industrial, and oil-field equipment.

It also gives you the many compressor improvements developed by Le Roi engineers . . . for example, safe, speedy towing to and from the job site — plus quick, easy on-site "spotting," so that your air power goes into action faster and you finish sooner.

A complete line to fit your needs

Le Roi Compressors are available from 60 to 315 c.f.m., gasoline-powered — 105 to 500 c.f.m., Diesel-powered — on mountings to meet your individual requirements. Make all the comparisons you can think of — then equip with Le Roi's, for air power that sets a new standard of performance and cost. See your nearby Le Roi distributor.

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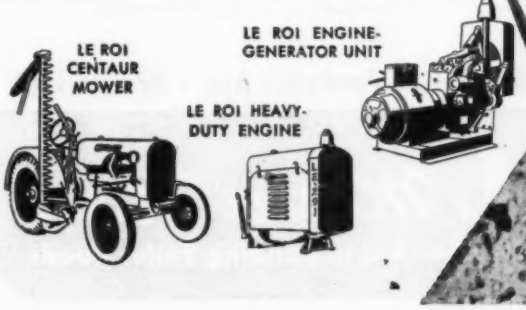
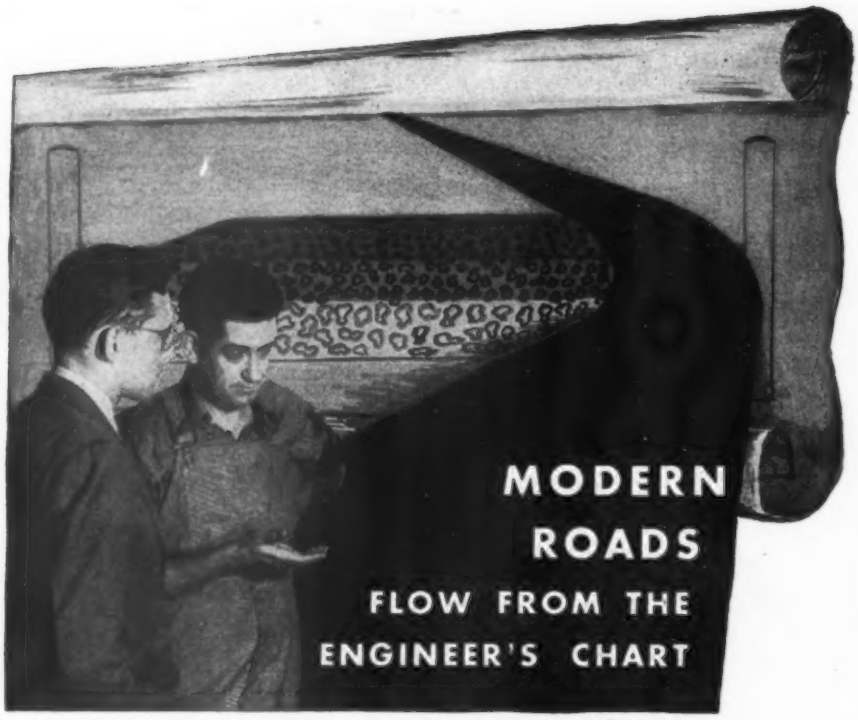
LE ROI MILWAUKEE *Portable* COMPRESSORS





The nation's vast network of roads is one of the early projects on the engineer's peacetime charts. Roads are in need of repairs. New and better roads must be built.

KOTAL Master Mixes, a revolutionary development, make available to the engineer an all-weather, easy-to-use bituminous mix that works to achieve tough, long-wearing roads ... at *low cost!*

Today, with thousands of workers released from wartime jobs, there is an unusual opportunity to restore and improve the nation's roads. KOTAL Master Mixes are ready to demonstrate their post-season workability in the "reconversion" of America's roads.

Write for your copy of booklet which describes and illustrates how KOTAL Master Mixes are being used by leading engineers. The name of your nearest supplier will also be sent.

8 FEATURES
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EASY TO USE. Quickly mixed, ready to lay. No preheating or drying.

STABILITY. Give firm surface quickly, ready for traffic. No shift, ravel, or pick up.

WORKABILITY. Do not adhere to equipment. Work easily.

LONG-TERM STOCK PILES. Remain workable in stock piles for many months.

SAVE TIME. Quickly-made ready-for-use stock piles, eliminating frequent fresh mixes.

SAVE LABOR. Actual road records prove fewer labor hours required.

SAVE MONEY. Savings in time and labor mean economies in road costs.

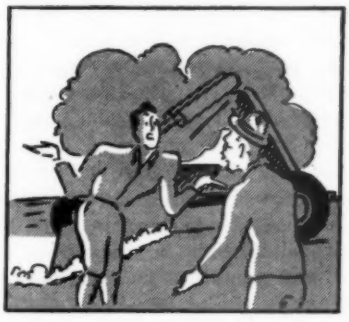
EXTEND PAVING SEASON. All-weather workability ... more months of operation.

MASTER MIXES KOTAL **KOTAL COMPANY ★ 52 Vanderbilt Ave. ★ New York 17**

KOTAL *Master Mixes*
The Advanced All-Weather Aid in Building Better Roads

(a) Perform an Accurate Detailed Survey

Little need be said here about the methods to be used in "performing an accurate detailed survey." The engineer's schooling is primarily to fit him for this work, and his experience enables him to do this job with increasing accuracy and efficiency. The engineer should consider level notes, angles, dimensions, available materials, working conditions, borings, cost data and all such material as the detailed survey discloses as facts. He must be sure they are facts and thereafter treat them as such. It is impossible to over-emphasize the importance of sub-head (a) "Perform an Accurate Detailed Survey." However, an engineer's reputation and standing will, to a large extent, depend on the judgment he uses in the time and money consumed in this phase of the work. It definitely can be overdone.



★ You'll have to dig this stuff out and replace it

(b) Review the Record

Proper action by the engineer in "Reviewing the Record" will, in most cases, pay good dividends by saving time, money and possible embarrassment. Someone else may have tried a procedure similar to the one it is proposed to use and may have found it impractical, may have patented the process, may have found ways to improve it, may have found it too costly, or it may develop that an opportunity exists to study a finished project built under the procedure in question. It often happens that someone else has done work previously on the project and valuable data is available. Again, other somewhat similar projects may have revealed pertinent local conditions which are not revealed in the detailed survey. Failure to review the record may result in a choice of materials which previous experience, as recorded in text books, reports or other literature, has proven to be unwise for the purpose intended. I have on several occasions known of expensive tests and experiments being performed, which were to all intents and

purposes a duplication of the efforts of some other agency, with a complete record of the previous tests available in recorded form. Cost data is nearly always available, the proper use of which will very often save the owner needless expense.

(c) Find Out What Rules and Customs Apply

Neglecting sub-head (c) by failing to determine the rules and customs which apply in connection with either the locality where the project is to be carried on or the uses to which the completed project is to be placed, can and usually will, result in any one of a number of undesirable happenings and embarrassment. Building codes, ordinances, tax laws, labor regulations, local idiosyncracies and local politics can be major factors having a very important bearing on the design, specifications and drawings. This sub-head should never be forgotten and should always be checked before the job is sent out for bids.

(d) Talk with Individuals Concerned

It is advised that a liberal interpretation be given to the sub-head (d) "Talk with Individuals Concerned," particularly as to just which individuals may have the desired information. I imagine nearly every engineer has had the experience of being surprised at the wealth of knowledge some native will divulge if he is properly handled. Talks with the owner and the user will nearly always reveal information of value. Judgment is called into play, and the better the judgment as to whom to talk with, and when, the better the engineer's reputation becomes. Each project presents a different problem, but the smart engineer listens and asks leading questions. He should remember that lots of people never reached the place their capabilities entitled them to because they talked when they should have been listening.

(e) Get Opinions and Feelings

Getting the opinions and feelings of people involved with a particular project is definitely tied in with the previous sub-heading. Very few major projects do not involve the opinions and feelings of either the owner, the people closely associated with the actual construction, or the user of the finished project. People enjoy expressing their opinions and feelings. The information so gained is free and often enough worth just what it costs, but the effort involved will be amply rewarded by the blending effect it has when the engineer reaches Step II.

Resume Step I

The essence of Step I is summed up in "Be Sure You Have the Whole Story." Regardless of the pressure to get the job out, time and work will be saved by religiously following all the parts of Step I and being certain you have the whole story. It is not the intention of the writer to advocate procrastination or needless delays, but the engineer must always remember everything else he does depends upon doing a good job of Step I. By doing so the chances are that the engineer won't have to alibi unexpected job conditions, or the oversight of some important phase of the work. His contractor relationships have better than a fifty-fifty chance of being good and a good chance of being excellent. His subordinates will enjoy working for him and the cost of engineering will reflect his effort as a saving. BE SURE YOU HAVE THE WHOLE STORY.

(*Continued from page* 78)

up of tax liens. This city also is preparing a design guide or manual on highway safety and traffic to aid in better planning of subdivision streets.

New Approach on Slum Clearance

One of the most provocative general-session papers was that on slum clearance by Elizabeth Wood, executive secretary, Chicago Housing Authority. She pointed out that attempts to rebuild blighted areas with new housing are usually made for the primary purpose of aiding a business district. The bigger and more primary needs—to restore municipal income or provide needed new facilities for private enterprise—are usually not the governing ones, but should be.

Slum clearance projects must be at least as attractive, i.e., well flowered, landscaped and laid out, as suburban areas. If not, they cannot compete, especially when handicapped by smoky air, soured soil, traffic noises, undisciplined garbage habits and other reasons why living in the midst of a large city is often fundamentally undesirable. Excerpts from Miss Wood's paper:

"The phrases 'slum-clearance' and 'urban-redevelopment' are heard everywhere these days. They represent the beginning of a public demand for social betterment. They represent a recognition of the imminent death of large cities and a recognition of a need for new areas in which the business of residential construction can operate. . . .

"People have said that one of the economies of slum re-building is the economy of using existing utilities. This is the most fallacious belief according to our experience. . . .

"Our experience has shown that no matter how aged the buildings or how great the physical decay, slum land is expensive to buy if it has any buildings on it at all. . . .

"It is in multiple ownership, which means that land acquisition cannot take place without exercise of police powers. . . .

"In the state of Illinois, two other measures have been introduced—a direct state appropriation to be used for the acquisition of slum land for which housing shall be built either by public or private enterprise. Under the Act there may or may not be a write-off of the land cost. . . .

"There is also the provision for municipally issued bonds for a similar purpose. Chicago recently authorized by referendum a $5,000,000 bond issue for this purpose. These funds represent a new program of attack on the problem and because of their terms may provide a very significant group of experiments. . . .

"There is additional legislation pending. Congressional leaders are proposing an extension of the present U. S. Housing Act and also a mechanism similar to that provided under the State urban re-development legislation, but including the essential factor of subsidy for the write-off of land costs. This legislation is directed solely to private construction. . . ."

Any urban redevelopment, to succeed, must be bold and comprehensive, reminded Miss Wood. And it must be based on an unalterable determination to relocate all transit and traffic in such a way that the blighted areas are subdivided into (80-acre) superblocks which no public transit passes or enters. In fact so designed that traffic entrance to interior streets is discouraged.

"On the basis of experience with large urban redevelopments we know that if blighted areas are not rebuilt in these protected superblocks all expenditures will be wasted. The great costs involved in the alternate island developments will be wasted. Little plans will require a redoing of the total job within three generations. Bold plans will not.

"The public taste is clear and is evident by every trend that every competent subdivider and realtor knows; the public desire is for the amenity of grass, trees, protection from noise and danger of traffic. The

(*Continued on page* 122)

NEW EQUIPMENT AND MATERIALS

Postwar Parade

of New Construction Equipment and Materials

New ½-Yd. Shovel

1. A new ½ yd. excavator on crawler mounting, Byers Model 61, has been brought out by the Byers Machine Co., Ravenna, O. This is a comparable model to Byers "Traveler," recently announced ½ yd. shovel on self-propelled, 1-man operated, rubber tired chassis. Model 61 is the second new shovel and crane announced this year by Byers. Model 61 embodies many of the same design features as the "Traveler," including full ½ yd. capacity, Airflex finger tip air clutches, gears enclosed and running in forced circulating oil, wide and large tandem drums and new

Model 61 ½-yd. excavator

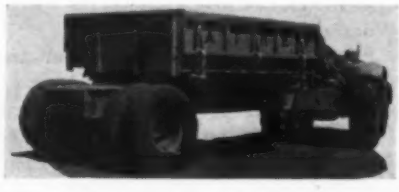
patented worm type boom hoist. In numerous ways, the upper deck machinery, cab and attachments are the same as and interchangeable with the "Traveler" model. All main frames are of welded and bridged rolled steel construction and crawler base of the model 61 is 10 ft. 8 in. long and 8 ft. wide. The 18 in. wide treads are self cleaning, non-clogging and roller chain driven. Wider, longer crawlers are available for soft ground travel and for crane and dragline work. Clutches for steering crawlers to left or right are engaged by the same air pressure that is employed to engage upper deck friction clutches. Crawler steering controls are handy thumb operated latches, conveniently banked with other levers, that may be operated at will while travelling without arresting the forward or reverse momentum of the machine.

Two New Greases

2. Two new silicone greases, DC 33 and DC 44, have been introduced by Dow Corning Corp., Midland, Mich. Two other greases DC 31 and DC 41 have been improved since they were introduced last year. The two new silicone greases are serviceable in ball bearings operating at speeds up to 10,000 r.p.m. and are subject to bleeding of less than 2% after 16 hours at 110°C. (230°F.) One of them, DC 33, is effective over a temperature range of —94°F to 300°F. The other, DC 44, is serviceable at temperatures ranging from —4°F. to 345°F. Their low volatility and their very slight tendency to bleed are stated to recommend them for the sealed-in lubrication of ball bearings and for the lubrication of bearings operating at abnormally high and low temperatures.

New 2-Way Dump Trailer

2. A new rubber tired unit—PD 10 trailer—has been added to the line of Athey Products Corporation, 5631 W. 65th St., Chicago, Ill. The trailer has been designed for use with "Caterpillar" DW-10 tractor for high speed hauling. The hydraulically-controlled PD-10 has an approximate



PD-10 trailer

shipping weight of 15,000 lbs. Its heaped capacity is 10 cu. yds., and struck, 8 cu. yds. In dimensions, it is 21 ft. long, 9 ft. 4 in. wide, 7 ft. 2 in. high at rear, and 7 ft. 10 in. high at front. It discharges its load from either side at a 55 degree angle. The unit is mounted on 1400 x 20, 16 ply tires.

New Hydraulic Conveyor Truck

4. A new hydraulic cradle truck for portable conveyors has been introduced by Pioneer Engineering Works, Minneapolis, Minn. This new truck can be raised or lowered quickly by

New hydraulic conveyor truck

one man at the lever of a simple hydraulic pump actuated by virtually "finger-tip" control. In the lowered position, the truck is stated to require much less headroom than the old-style mast truck, and portability is improved.

New Pressed Globe for Luminaires

5. A new pressed globe known as the No. 232, designed to reduce utility maintenance expense and improve appearance, has been announced by the General Electric Co.'s Lighting Division, Schenectady, N. Y. The largest of the pressed type, it is currently available for use with G-E Form 81 and 101 luminaires. The new globe,

shorter than those now employed, is available in clear glass only. Because it is pressed in molds for uniform thickness, annealed to eliminate strains, and has a smoothly-finished edge which eliminates the strain on cracked surfaces of blown glass edges, its life is expected to be considerably longer than that of blown globes.

New Shovels and Cranes

6. Four new heavy-duty machines, each of which incorporates outstanding features developed from wartime engineering experience have been announced by the Thew Shovel Co., Lorain, O. The line, designated as the Lorain "41" Series, consists of a chain-drive crawler machine and three rubber-tired machines, one with 4-wheel drive, one with 6-wheel drive

New chain drive crawler shovel

and a third of the self-propelled type. The two-speed, crawler machine features an entirely new mounting that is longer, wider and heavier. Standard treads are 30 in. in width and travel speeds in either direction are ¾ and 1⅝ miles per hour. Steering is done from cab in any swing position of boom. Tread and travel lock is also a new development, being of the positive, 4-way ratchet and pawl type. The unit, which is convertible to shovel, crane, dragline, clamshell or back-digger, has increased crane, clamshell and dragline capacities. The four-wheel drive Moto-Crane is of 20-ton capacity with specially designed 6-wheel carrier for shovel and crane loads. With ten speeds forward and two reverse, this new rubber-tired machine has a speed range of from 1 to 28 miles per hour. This unit is also convertible to shovel, crane, dragline, clamshell or back digger. The 6-wheel drive moto-crane offers a heavy duty, 20 ton capacity crane that was developed for and used in military service. This crane has double-reduction drive on all axles, eight speeds forward and two reverse, and will travel from 1 to 31

THE NEW JACKSON GENERAL CONCRETE CONSTRUCTION VIBRATOR

EASIER TO HANDLE

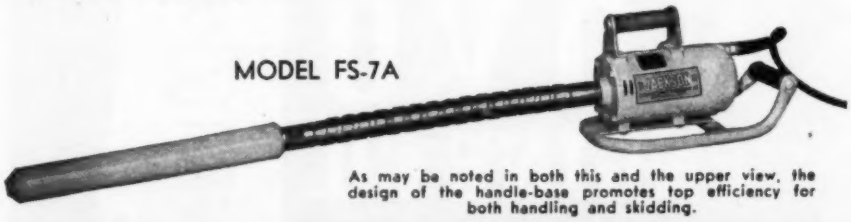
MORE POWERFUL

DOES THE WORK OF LARGER VIBRATORS

Here's unprecedented power in a lightweight, easy to handle electric vibrator, capable of operating vibrator heads as large as 2⅜" x 18⅝" with flexible shafts up to 21' in length. Universal motor operates on 115 volt A.C. or D.C. and will deliver from 7000 to 10000 V.P.M. depending on the consistency of the concrete and the length of shaft used. It will take any of our standard flexible shaft vibrator heads: 2⅜" x 18⅝"; 1 3/8" x 16⅞"; 1 3/8" x 10¾", and may be had with shaft lengths of 24", 36", 7', 14', and 21'. It is, therefore, not only ideal for the thinner and smaller sections, but for the work previously done only by much larger vibrators, as well. It's truly a "general construction vibrator" — one that equips you to handle a great variety of jobs to best advantage — with only the price of one machine invested. Write for complete details.

A JACKSON FS-7A Flexible Shaft Vibrator placing concrete in the manufacture of precast piling.

MODEL FS-7A



As may be noted in both this and the upper view, the design of the handle-base promotes top efficiency for both handling and skidding.

ELECTRIC TAMPER & EQUIPMENT CO. LUDINGTON MICHIGAN

POST HOLE PUNCH

The Novo Post-Hole Punch is the ideal unit for punching guard-rail post-holes! It is the latest accessory for the Novo Pavement Breaker.

200 guard-rail post-holes per 8-hour day is the average production of the Novo Pavement Breaker with Post-Hole Punch Attachment! It usually requires only three punches by this powerful machine to complete a hole ready for setting the post!

The Novo Post-Hole Punch is a 10" seamless-steel tube, 54" long! It replaces the standard Breaking-Nose on the Breaking-Hammer, using the same two "U" bolts. Its Stoodite-faced steel point provides positive penetration of surfaced shoulders and frozen ground! A collar, welded around the top of the point, cleans out holes on the up-stroke!

Safety dictates the use of plenty of highway guard-rails! Speed and economy dictate the use of the Novo Post-Hole Punch for setting guard-rail posts!

Bulletin No. 122 contains complete information on the Novo Post-Hole Punch, Bulletin No. 221 on the Novo Pavement Breaker. Send for either or both of these Bulletins!

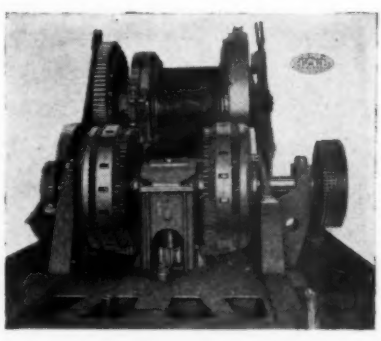
Allied Member of A.E.D.

NOVO ENGINE CO.

miles per hour. The self-propelled crane is of the single engine, single operator type and power is supplied on four worm-driven rear wheels. There are four travel speeds ranging from 1 to 7 miles per hour in both directions.

Electric Clutch for Excavators

12. A new clutch that transmits power for swing and propel motions of excavators by means of electromagnetic forces has been developed by Harnischfeger Corp., Milwaukee, Wis. The unit already is in operation on several P&H 3 yd. excavators. In applying the Magnetorque swing unit to their new Model 1055 friction



Magnetorque Swing Unit

shovel, Harnischfeger engineers borrowed the principle which has proved so successful on P&H electric shovels. On the 1055, the Magnetorque unit is mounted on the jackshaft in much the same manner as the conventional swing clutch, and is driven by the 240 HP. diesel engine. On the diesel is a small generator which furnishes excitation for the transmission of power. Operation of both swing and propel motions is effected through the Magnetorque unit by two small controls at the operator's station.

New Deci. Point Slide Rule

8. Several important new features are being incorporated into the deci. point slide rule, manufactured by Pickett & Eckel, 53 W. Jackson Blvd., Chicago, Ill. The rule is now being manufactured of light-weight Dowmetal which makes possible a number of advantages. Dowmetal permits superior accuracy as it is not affected by climatic conditions of heat, cold or moisture. There is no perceptible warping, swelling or other distortion. Dowmetal, moreover, can be machined to extremely close tolerances. This permits the use of self-centering

"optical groove"—a type of tongue and groove construction favored in optical instruments because it prevents side play and binding. The Dowmetal core is surfaced with a flat white plastic that is impervious to water or chemicals and virtually immune to abrasion from regular use. On this plastic, the scales are placed by a special process which insures extreme accuracy and legibility.

New 1½ Yd. Excavator

10. A new 1½ yd. model 38-B fully convertible excavator has been announced by Bucyrus-Erie Co., South Milwaukee, Wis. Fundamentally constructed for equal effectiveness as a shovel, dragline, crane or clamshell, the new 38-B offers a number of operating refinements. As a dragline, the 38-B has big working ranges with a new mast-type suspension available for long booms. Full rotating fairlead, selection of wide, long and tapered end crawler mountings for ample bearing area and superior performance in soft going are other dragline features. Advantages of the new 38-B shovel include a strong but light boom with large diameter point sheaves for effective application of digging force, independent positive twin rope crowd and high lip all-welded dipper for fast filling and dumping. As a crane, the 38-B offers long booms with optional jib extensions, two-clutch-operated independent boom hoist with full, accurate power control of raising and lowering, and optional independent two speed propel.

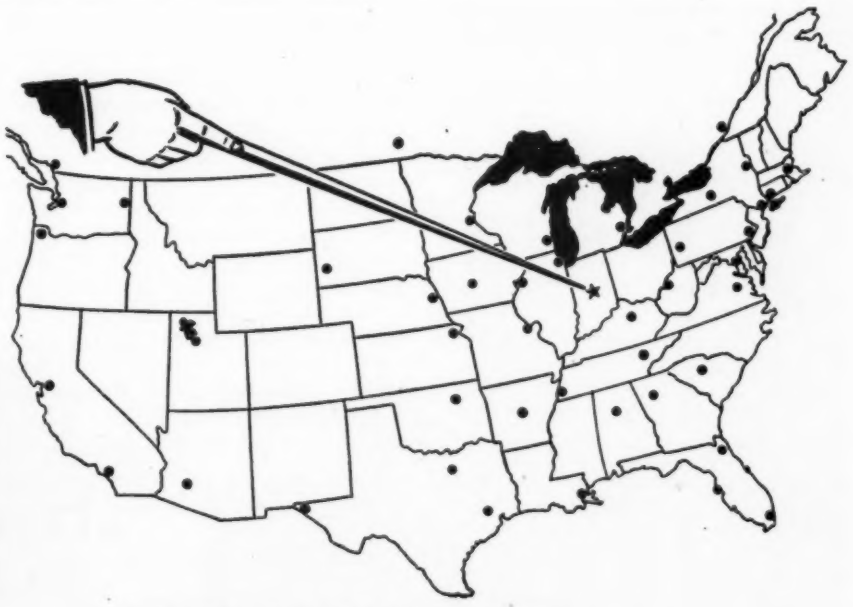
Model 38-B 1½ Yd. Shovel

New Tire Development

10. A wire-corded heavy duty tire that is stated to be practically blow-out proof has been announced by Firestone Tire and Rubber Co. Fine metal wire cord with a very high tensile strength is firmly bonded with rubber to provide the foundation of the new tire. Every cord in every ply is five times as strong as the strongest cord heretofore used in conventional tires. Because of the strength of the metal, fewer plies are required, and the walls of the tire consequently are thinner. This contributes toward cooler running. The safety secret of the tire lies in the strong but thin construction and the heat-conducting nature of the wire cords. Heat is carried away from the hot spots within the tire and dissipated by the metal.

New Crane Unit

11. A new rubber mounted, mobile crane unit embodying power shovel, trench-hoe, dragline and clamshell, is now in production by American Steel Dredge Co., Inc., Fort Wayne, Ind. Among the important features claimed for this new unit are: Independent or simultaneous operation of boom, shovel or trench hoe, or propulsion mechanism. The unit can travel, boom, swing and hoist at the same time. Self-leveling chassis which permit operation on uneven ground. Full-vision cab—the operator can see



SERVICE...
Where You *Need* It!

From the service angle alone, you, the owner of an Insley Excavator, have two big points in your favor for profitable completion of your "bids." *First* is the nation-wide organization of more than 50 Insley Sales and Service Representatives which assures you complete service facilities, competent mechanics, genuine Insley parts, within easy reach, wherever you are.

Second is Insley's policy of backing up dealer service . . . the policy that is summed up in this pledge to every owner of an Insley Excavator: That at least 96% of all replacement parts orders for current model Insley equipment will be shipped from the factory the same day as received.

For low-cost yardage on your job . . . for service *where you need it* and *when you need it* . . . contact your Insley Dealer today.

INSLEY MANUFACTURING CORP., INDIANAPOLIS 6, IND.

in all directions. All machinery gears enclosed and oil-immersed. No center-pin; the cab revolves on a 48-in. ball-race outside the swing-gear. The power plant is a 60-h.p. gasoline engine which drives all four wheels and the hoisting mechanism. The capacity of the crane is 4 tons at 10 ft. radius. The shovel, dragline and clamshell capacity is ½ cu. yd. The new unit will be sold under the trade name "Wayne Crane" and will be available as a crane or complete with accessory groups for use as a power shovel, trench-hoe, clamshell and dragline.

New Diesel Wellpoint Pump

12. A new addition to the wellpoint equipment of the Griffin Wellpoint Corporation, New York, N. Y., is a Model 108-D, 10x8, Vac-U-Matic wellpoint pump powered with an International UD-9 engine. Due to increased horsepower, this model pump now delivers 2800 GPM—300 GPM greater than its former rating powered with gasoline engine. In addition, many mechanical improvements have been incorporated, particularly the elimination of all packing in the stuffing box.

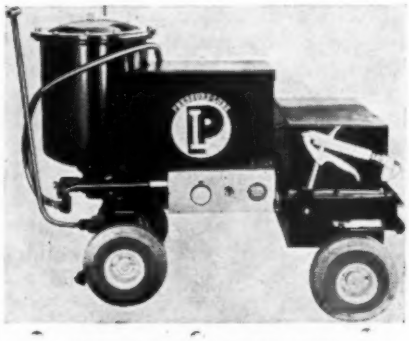
Model 108-D Wellpoint Pump

New Crane

13. Hughes-Keenan Co., Mansfield, O., has announced a new Roustabout crane, Model MC-8, which handles loads to 10 tons. It's a mobile full-swing boom crane, tractor mounted, that is easily driven where needed. Booms of standard lengths from 15 to 30 ft. are furnished; MC-8 is especially adapted to use of long booms, will handle loads of nearly 2 tons at a 30 ft. radius, 10 tons at 9 ft. Ball-bearing boom turntable and all gears and clutches run in oil, fully enclosed. Boom swing and hoist and load hoist are all independent actions, with separate controls and automatic brakes. Ruggedly built, designed for easy efficient operation.

New Portable Greasing Unit

11. A new portable lubrication unit has been placed on the market by Pressurelube, Inc., New York, N. Y. The equipment can be supplied with a grease gun for every purpose and is available either with battery powered or gasoline driven motor. Flexible economical operation is stated to be assured by its complete portability—no electric cord or air hose is required. Unit is stated to deliver up to 12,000 lb. steady, consistent pressure, which is instantly available to clear the most obstinate channel stoppages and effect complete lubrication of parts.



New Portable Greasing Unit

SERVICISED RAIL FILLER MOLDED TO YOUR SPECIFICATIONS TO FIT ANY TYPE OF RAILS.
CHICAGO SO. SHORE & SO. BEND R.R. MICHIGAN CITY, IND.
OUTSIDE
INSIDE
SERVICISED RAIL FILLER
HANDY LENGTHS, LIGHT IN WEIGHT, EASY TO TAP INTO PLACE.
COMPLETED SECTION—SHOWING SMOOTH, CLOSE, WATERTIGHT JOINTS.

STEEL TRACKS *in* CITY STREETS

ARE A CONSTANT HAZARD AND SOURCE OF EXPENSE UNLESS

INSULATED

With Servicised Rail Filler as shown in opposite views.

BITUMINOUS PREMOULDED RAIL FILLER as manufanctured by Servicised, holds the rails in secure resilient contact with pavement, eliminating Expansion and Contraction damages; cuts down maintenance costs, muffles noise, diminishes vibration, and minimizes realignment problems.

SERVICISED PRODUCTS CORP. maintains an Engineering Staff which will be glad at any time to assist with specifications and other data at your request.

MAIL IN THIS COUPON TODAY FOR MORE DETAILED INFORMATION.

SERVICISED PRODUCTS CORP.

6051 West 65th Street — Chicago 38, Ill.

NAME .....

STREET .....

CITY .....

11-R&S

MANUFACTURERS' LITERATURE

Lubrication and Maintenance Guide

15. The second edition of its guide for the lubrication and maintenance of construction equipment has been brought out by the Gulf Oil Corporation, Pittsburgh, Pa. The information in the guide is based on daily contact with contractors' problems on construction jobs and Gulf's cumulative experience gained from close-working association with equipment manufacturers. Subjects covered in this 76 page book, include engine lubrication, care of air cleaners, care of power transmission assembly, crawler mechanisms, general bearing lubrication, cold weather operating hints, general lubrication chart, etc., etc.

Pressure Distributor

16. The Littleford "Spray Master" pressure distributor is illustrated and described in a brochure issued by Littleford Bros., Inc., Cincinnati, O. Various details of the machine are pictured together with descriptive matter.

Government Contracts Procedure

17. The fourth edition of O. R. McGuire's "Manual of Procedure Under Government Contracts" has just been published by Fidelity and Deposit Co. of Maryland. It describes the laws, regulations and decisions applicable to contracts with the Federal Government for construction work or for furnishing supplies. The manual covers the following: The Bid; The Competitive Contract; Contracting Agencies of the United States; Contracts with Government Corporations; Settlement of Claims Under Government Contracts; Government Sales; War Contracts and Their Settlement.

Kotal Master Mixer

18. Advantages of the use of Kotal in road construction are given in a circular issued by The Kotal Co., New York, N. Y. The working features of Kotal Master Mixer also are summarized.

Spiralok Dynamite Cartridge

19. A new booklet illustrating the advantages of using Spiralok has been published by Hercules Powder Co.'s Explosives Department, Wilmington, Del. Spiralok consists of dynamite packed in a strong paper shell equipped with a spiral thread. This shell screws into a stout spiral-grooved sleeve. In loading, a sleeve is screwed over the two halves of adjacent cartridges until they butt together.

Air Entraining Agent

20. A bulletin issued by Dewey and Almy Co., Cambridge, Mass., gives some important facts regarding Darex AEA, a compound that works on the sand constituent of concrete as an air entraining agent. The bulletin tells what it is, how it works and gives pertinent facts on its use. Charts show effect of agent on control of entrained air and on durability of the concrete.

Cash in on the Big Jobs Ahead

WITH THIS PORTABLE ALL-ELECTRIC ASPHALT PLANT

H&B — ESTABLISHED 1867

Manufacturers of Portable and Stationary Asphalt plants of all types and capacities.

This rugged, all-electric plant will give you the volume, uniformity and economy of production that will be needed in meeting post-war competition on the big jobs.

Sectional type construction makes for quick assembly and disassembly, and easy portability. All units are driven by individual motors, and are completely wired at our factory. Once the plant is assembled, you are ready to hook up to the power line and start operating. The new horizontal type cyclone dust collector and the larger size fan are among the refinements in design which make for greater compactness and increased efficiency.

Get your order in now for one of these modern plants. Write or wire for specifications and complete information.

HETHERINGTON & BERNER INC.
721 KENTUCKY AVENUE • INDIANAPOLIS 7, INDIANA

FOR BEST RESULTS — BATCH MIX • HOT MIX

Front End Loaders

21. The Scoopmobile, a product of the Mixermobile Co., Los Angeles, Calif., is illustrated and described in a folder issued by the company. Specifications are included, as well as illustrations of Scoopmobiles operating under actual field conditions.

Lubrication Chart

22. Especially prepared for service and maintenance men, a wall chart, 17 by 22 in., has been issued by R. G. Le Tourneau, Inc., Peoria, Ill., for use as a quick guide in lubricating its equipment. Illustrations show lubrication points on Le Tourneau equipment, and the chart tells what kind of lubricant to use and how often.

Trailer

23. A folder describing the Tournatruck—a flat bed, big-tired trailer powered by a Tournapull—has been issued by R. G. Le Tourneau, Inc., Peoria, Ill. The folder points out how plans for variation in size and style of trailer bed provide different combinations to meet specific requirements.

GRUENDLER CRAFTSMANSHIP SERVING INDUSTRY 60 YEARS

With a remarkable record of accomplishments

for **Greater Capacity...**

Here is a JAW CRUSHER

built to do a better job on the toughest rock

Operators of Crushing Plants on location of harder rock deposits, asked the Gruendler Engineers for a sturdier Jaw Crusher better able to withstand the terrific strain on the toughest jobs, and still increase their ton per hour output.

This problem answered by our Engineers who with their long experience together with advanced designing and application of improved and tougher steel alloys—now offer a BETTER CRUSHER to do a BETTER JOB.

WRITE for ILLUSTRATED DATA and BLUEPRINTS

GRUENDLER ST. LOUIS, U.S.A.

Manufacturers of PRIMARY AND SECONDARY HAMMERMILLS FOR LIMESTONE DISTRICTS

GRUENDLER

CRUSHER and PULVERIZER CO. • ST. LOUIS 6, MISSOURI

Hydraulic Power Steering

24. Hydraulic steering boosters for trucks and road equipment designed to make steering easier and to eliminate "road shock" and "wheel fight," are illustrated and described in a bulletin issued by Garrison Mfg. Co., Los Angeles, Calif. Installation instructions for the booster are given, as well as illustrations of typical installations.

Conveyor Belts

25. Graphically describing the role which large conveyor belts are playing in the transportation of vast amounts of material on construction and other projects, The B. F. Goodrich Co., Akron, O., has just published a folder relating the job which the company's belts accomplished during the building of Shasta Dam.

Truck and Bus Lubrication

26. A 40-page brochure issued by Sinclair Refining Co. discusses lubrication requirements of engines, characteristics of motor oils, deterioration of oils in service and preventive measures, also selection of correct oils and greases and proper application. Practical servicing of modern design vehicles with modern lubricants is featured.

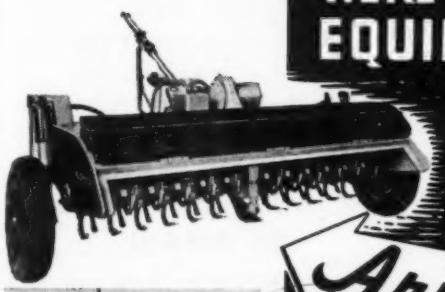
Float Finisher

27. The Johnson float finisher is illustrated and described in a bulletin published by Madsen Iron Works, Huntington Park, Calif. It tells how it finishes concrete slab to a surface smoothness unequaled by the best hand float finishing; illustrates its adjustability to all road curves and explains its features and operational procedure.

Single Acting Pile Hammer

28. A 16-page bulletin issued by McKiernan-Terry Corporation, New York, giving detailed information on its line of single-acting pile hammers, describes the special purposes for these drivers and lists their advantages. Specifications, cross-section diagrams and listing of component parts are included, also detailed data on operation.

HERE'S THAT EQUIPMENT YOU'LL NEED FOR SECONDARY ROADS



Ariens AGGMIXER

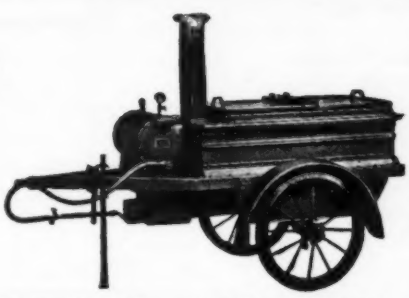
ARIENS Aggmixer is equipment designed especially for mixed-in-place construction work, operating in connection with other general purpose equipment—for use wherever aggregates are used, such as all types of bitumens, clays, chlorides, cements, etc. It mixes these materials without displacing them on the road surface, thoroughly pulverizes, mixes and aerates the aggregates with the binder used. It does the job thoroughly, rapidly, and economically. Safe and easy to operate. Adjustable to any tractor, with simple and positive hydraulic adjustment for depth. Made in 4 sizes with normal cutting widths 4', 5', 6' and 7'.

Write for complete job facts and name of nearest distributor.

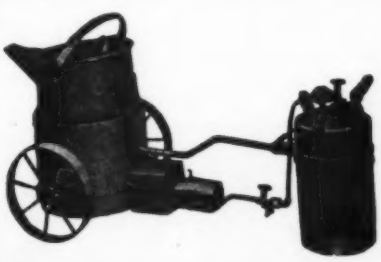
ARIENS COMPANY BRILLION WISCONSIN

CONNERY'S HEATING KETTLE

For speedy heating of tar and asphalt—



Use this CONNERY oil-burning Patrol Patching Heater on the *small* job and this CONNERY oil-burning kettle for *large-quantity* production.

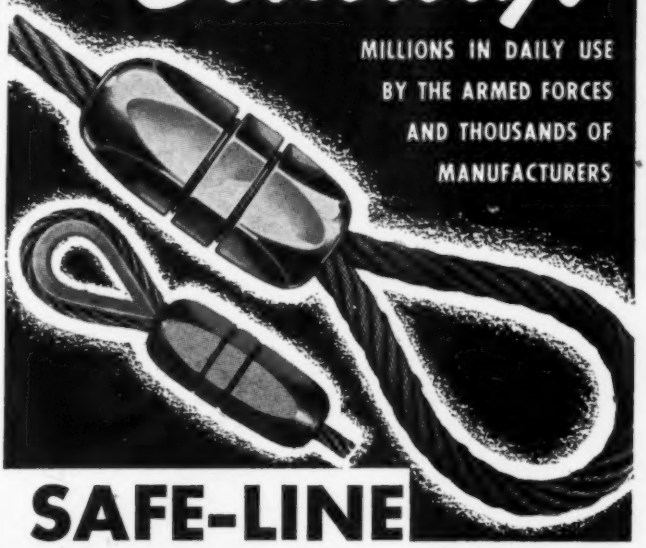


Write for catalog showing our full line of tar and asphalt heating kettles, spraying attachments, pouring pots, etc.

CONNERY CONSTRUCTION Co.
3900 North Second St. Philadelphia, Pa.

A BETTER METHOD OF HOLDING WIRE ROPE *Securely!*

MILLIONS IN DAILY USE BY THE ARMED FORCES AND THOUSANDS OF MANUFACTURERS



SAFE-LINE WIRE ROPE CLAMP

Eliminates Splicing and Serving
Much faster—saves time—reduces cost. Minimizes rope or sling breakage. Holds tight thimble.

Easy to Use, Easy to Re-adjust
No highly skilled labor or special tools required. Easy to adjust as rigging stretches.

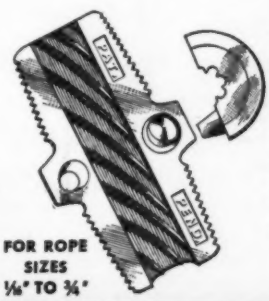
Outpulls Strongest Rope—Never Slips
¾" 6 x 19 Improved Plow Steel Wire Rope broke at 46,850 pounds on Riehle Testing Machine. SAFE-LINE Clamp *held.*

Economical—Use Again and Again
Thousands of the first SAFE-LINE Wire Rope Clamps made are still in use. Low initial cost.

Safe—Prevents Personal Injury, Mental Hazards
Exposed needle-sharp wire ends safely enclosed inside of clamp protects against cutting or scratching hands and arms. Smooth rounded shape prevents catching clothing or fouling.

Replacement Guarantee
Every SAFE-LINE Wire Rope Clamp carries a replacement guarantee against breakage and fracture.

APPROVED BY UNDERWRITERS LABORATORIES
APPROVED BY CIVIL AERONAUTICS ADMINISTRATION



FOR ROPE SIZES ⅛" TO ¾"

Never Slips

FORGED AND MASTER COINED TO FIT ROPE

Double spiral splines fit each wire and strand, provide a perfect, secure GRIP on rope. Pressure equally distributed over large area eliminates cutting action. Locking lugs automatically line-up threads.

WRITE FOR DESCRIPTIVE PRICE LIST FOLDER

NATIONAL PRODUCTION COMPANY
4571 ST. JEAN AVENUE • DETROIT 13, MICHIGAN

Wire Rope Clamps

29. A wire rope clamp that eliminates splicing and serving and prevents personal injury for severed strand of wire rope, is illustrated and described in a folder issued by National production Co., Detroit, Mich. It is stated that the holding power of the clamp is far in excess of any demand that can be put on the wire rope. This Safe Line clamp consists of two halves. The inside of each half is made to fit the rope, the large grooves pocketing the large spiral strands, and the small grooves pocketing each small wire that makes up the strands.

(Continued on Page 113)

public has little chance to express this desire, but the expenditure of public subsidies must be directed by it."

Veteran's Award

Old timers honored at the APWA meeting in recognition of 30 years' continuous employment with one city were: Carl O. Nygard, supt. of incineration, Minneapolis, Minn.; Albert G. Walter, supt., Water and Electric Dept., Dunkirk, N. Y.; Wm. H. Tolles, supt. of streets, Nashua, N. H.; and Gamble M. Bowers, director of public works, Richmond, Va.

PISTON-TYPE CONTROL VALVE

CENTER-LIFT HOIST

REVERSIBLE TAILGATE HARDWARE

EASY-REACH TAILGATE LEVER

HOIST MOUNTS ABOVE FRAME

ACCESSIBLE HOIST CYLINDER

PATENTED TIRE AND TOOL PACK

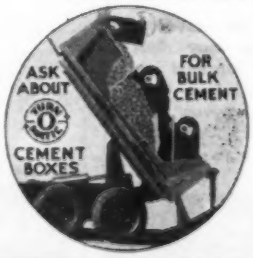
DASH CONTROLS FOR HOIST AND TAKE-OFF

Only from Hercules do you get these advantages for easy, low-cost, efficient operation and maintenance. For example—consider the fingertip controls which operate Hercules hoists and power take-offs. Pull out two buttons . . . up goes the body and the load is dumped. Push the same two buttons . . . the body slips down into road position. Simple, isn't it? And it's only one of a host of reasons why you'll want Hercules dump bodies for your new trucks.

Until you can get the new Hercules dump body you want, let your Hercules distributor keep your present equipment in running order. He will furnish the service you need.

HERCULES

DUMP BODIES AND HYDRAULIC HOISTS
SPLIT SHAFT POWER TAKE-OFFS • COAL CONVEYORS



Ask About Turn-O-Matic Cement Boxes for Bulk Cement—Now Available—Write Today!

HERCULES STEEL PRODUCTS COMPANY . . . GALION, OHIO

WITH THE MANUFACTURERS & DISTRIBUTORS

E. M. Ackerman Promoted by Riddell

Recent rearrangement of personnel in the Road Machinery division of the W. A. Riddell Corporation, Bucyrus, O., has resulted in the promotion of E. M. Ackerman to the position of sales manager. He has been with the W. A. Riddell Corporation in sales and service work for nearly 18 years. James E. Jones, who has been identified with the Riddell organization for the past two years and who has devoted his interests to the development of their newly added lines of agricultural machinery, such as "roll over" type scrapers and terracing machines, will supervise sales in that department and assist Mr. Ackerman in the road machinery division sales promotional work.

E. M. Ackerman

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New "Caterpillar" Representatives

Appointment of Carl F. Schober and Captain Kenneth F. Ames to the central sales division of Caterpillar Tractor Co. has been announced by J. J. Valentine, central sales division manager. Mr. Schober, who will serve as district representative in the states of Texas and New Mexico, joined "Caterpillar" in 1941. Captain Ames returns to the central sales division as a district representative in Montana, North Dakota, Saskatchewan and Alberta after more than four years in the service. He joined the sales training division of "Caterpillar" in 1936.

C. F. Schober

K. F. Ames

BEST ROAD SPREADER

Say Men who Build and Maintain Highways

- Spreads all materials to 1", wet or dry
- Spreads thick or thin
- Attaches to truck as tailgate
- Does not limit use of truck to spreading
- Controlled from cab with clutch
- Starts spreading with truck in motion
- No helper required
- Stops spreading with truck in motion
- Spreads forward or backward
- Half or full width of street
- Reduces number trucks required
- Positive uniform spread
- Fits any dump truck

SELF-FEEDING FLINK

Models WD31 and HD4 have protective cover pictured. Both cab controlled.

Sand-Chip Attachment

The ideal machine for seal coating, road re-surfacing, dust control. Trouble-free, no working parts to attachment. Write.

FLINK COMPANY, DEPT. 8, STREATOR, ILL.

The Sign of Safety

TUTHILL

—the Safer Guard Rail that Stands up Better

TUTHILL Highway Guard has that combination of features Highway Engineers like so well: A high degree of *safety, easy installation* and *low upkeep expense.* Made of strong steel, with panels cut to convenient length, this Guard is easy to install. Its strength to resist impact, and yet stand erect, means greater safety, besides a neater-looking, more permanent job. Proof? The hundreds of TUTHILL Guards along America's scenic highways. Available for maintenance or installation. *Write for details.*

Pacific Coast Manufacturers and Distributors:
U. S. SPRING & BUMPER CO., Los Angeles, Calif.

TUTHILL SPRING COMPANY
761 W. POLK ST., CHICAGO 7, ILL.

Streamlined Inside
for Higher Efficiency and Lower Operating Costs

RUGGED SIMPLICITY OF DESIGN ELIMINATES RECIRCULATION

NEVER LOSES PRIME REQUIRES LITTLE ATTENTION

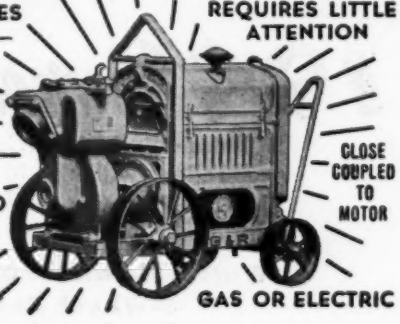
DELIVERS GREATER VOLUME PER GAL. OF GAS

NO ORIFICE OR PRIMING VALVES TO CLOG OR JAM

CAPACITIES UP TO 125,000 GPH

CLOSE COUPLED TO MOTOR

GAS OR ELECTRIC



Streamlined where it counts, you can't clog a Gorman-Rupp Self-Priming Pump. Unequalled in rugged efficiency, gallonage or continuous hours. A size and type for every need.

THE GORMAN-RUPP COMPANY, MANSFIELD, O

GORMAN-RUPP
SELF-PRIMING CENTRIFUGAL PUMPS

Burrows Promoted by Du Pont

Appointment of Dr. Lawton A. Burrows, as assistant manager in charge of research, Technical Division of the Explosives Department, has been announced today by E. I. du Pont de Nemours & Co., Wilmington, Del. He succeeds Dr. W. E. Lawson, a former director of Eastern Laboratory, Gibbstown, N. J., who is assigned to special duties. Dr. Wesley M. Nagle was appointed assistant director at Eastern Laboratory.

New A-C Manager

E. L. Aikins has been appointed district manager of the Allis-Chalmers Tractor Division office in Seattle, Wash. He will represent Allis-Chalmers interests in Alaska, Yukon and British Columbia. He succeeds S. B. Tatum, recently resigned to become president of Lomen Equipment, Inc., who handle Allis-Chalmers tractors and equipment in Alaska. The British Columbia and Yukon territory is served by Rendell Tractor & Equipment Co., Ltd., Vancouver, B. C.

R. M. Darr New Advertising Manager for Le Roi

The appointment of Robert M. Darr to the position of advertising manager of Le Roi Co. and Centaur Co. has been announced by John Dolan, manager of the sales division. Mr. Darr joined Le Roi Co. in January, 1941, as an instruction manual copywriter, becoming manager of that department a few months later. Because his work involved extensive research and planning in the publishing of U. S. Army and Navy technical manuals and service parts catalogs, he is completely familiar with the design and maintenance procedure of the entire line of Le Roi products.

R. M. Darr

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Moore to Barber Asphalt

The Barber Asphalt Corporation, Barber, N. J., has announced the appointment of Clark Moore as manager of its Asphalt Paving Sales Department. Mr. Moore was president of the Equitable Asphalt Maintenance Co. of Kansas City, Mo., manufacturers of road paving machinery. He has recently been connected with the Smaller War Plants Corporation as Assistant Regional Deputy Director. The Barber Asphalt Corporation, in addition to its oil refinery and oil asphalt operations at Perth Amboy, will resume the importation of Trinidad Asphalt for paving and industrial asphalt purposes. The company also has extensive holdings of gilsonite, a form of industrial asphalt.

Clark Moore

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Expands Plant

A 4-fold expansion of plant facilities to meet expected demands for brake linings for postwar passenger cars and trucks was begun recently by the Marshall-Eclipse division of Bendix Aviation Corporation with the breaking of ground for a new factory at Troy, N. Y. The new plant, now under construction, will be four times larger than all of the present buildings of the division.

1946 models ready now!

Buffalo-Springfield leads production of better-than-ever rollers with the Model VM-31, 10-ton, and Model VM-32, 12 ton Three-Wheel Rollers. See your Buffalo-Springfield Distributor today for full details.

Watch for announcement of the new 1946

3-Wheel Rollers, 6 to 8 tons
Tandem Rollers, 3 to 17 tons
3-Axle Tandems, 9 to 17 tons
Trench Rollers
Write for data

BUFFALO-SPRINGFIELD

The Buffalo-Springfield Roller Co.
Springfield, Ohio

The Oldest and Largest Builder of Road Rolling Equipment in America

THE
OWEN BUCKET COMPANY
6070 BREAKWATER AVE. CLEVELAND, OHIO
BRANCHES: New York, Chicago, Philadelphia, Berkeley, Cal.

OLD TIME GARLAND STANDARD

TRAFFIC ZONE Paint

IT WON'T BE LONG NOW

You can get Garland Standard—the old reliable Traffic Zone Paint in the very near future . . . Recent release of raw materials has made this possible . . . Tested on thousands of busy streets all over America, Garland Traffic Zone Paint has proved through the years that it is the one best bet for street marking . . . Traffic Zone Paint, made according to the proved Garland Formula, applies easier, adheres better, goes farther and fades less. For detailed information, write to—

THE GARLAND COMPANY
CLEVELAND, OHIO

DON'T THROW AWAY BROKEN PARTS—

Repair-Weld Cast Iron with

P&H "HARCAST"

You can make immediate repairs — save time — save money — keep equipment on the job longer with welding. No matter what the metal, there's a P&H electrode to weld it properly.

For example P&H HARCAST welds cast iron to cast iron as well as cast iron to steel. If you haven't used this new electrode for weld-repairing your broken cast iron parts — write us today for a trial sample.

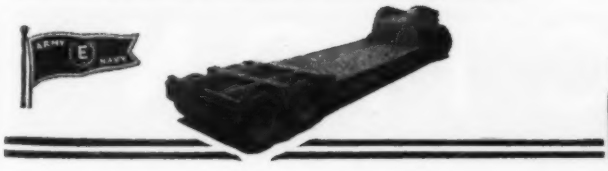
In fact, we can help you no matter what your weld repairing problems might be. Ask about the complete line of electrodes for hard facing against impact and abrasion.

Don't Delay — See your P&H representative or write for full information!

General Offices; 4496 W. National Ave., Milwaukee 14, Wis.

HARNISCHFEGER CORPORATION
WELDING ELECTRODES • MOTORS • HOISTS P&H ELECTRIC CRANES • ARC WELDERS • EXCAVATORS

Ease of tire changing



A VALUABLE ROGERS LOW-BED TRAILERS FEATURE

FORMERLY tire changing required jacking up the trailer and in some cases the removal of the whole axle unit. A big job in any event that was especially difficult if a tire went out while carrying a load.

With Rogers Trailer this job is comparatively easy, as it is possible to remove any tire without disturbing other casings.

ROGERS BROTHERS CORP. ALBION, PENNA.

EXPERIENCE builds 'em ROGERS LOW BED Heavy Duty TRAILERS PERFORMANCE sells 'em

E. C. Welden Joins Culvert Association

Elmer C. Welden, formerly deputy commissioner, Connecticut State Highway Department, has been appointed engineering director of the Association of Metal Culvert Manufacturers in New England, comprising Bancroft and Martin Rolling Mills Co. of Portland, Me.; Berger Metal Culvert Co. of Somerville, Mass.; and New England Metal Culvert Co. of Boston, Mass. Mr. Welden served the Connecticut State Highway Department as division engineer and for 18 years as deputy commissioner. After 31 years of continuous service he was retired May 15, 1941. After his retirement he was connected with the Zone Constructing Quartermaster Department in Boston and later transferring to Omaha, Neb., he continued with the U. S. Engineers when they took over all war construction.

•

New Macwhyte Director

R. P. Taylor, general sales manager of Macwhyte Co., Kenosha, Wis., has been elected a director of the company to fill a vacancy caused by the resignation of Mrs. George S. Whyte.

Scripture Returns to Master Builders

E. W. Scripture

Lt. Col. E. W. Scripture, recently with the Army Engineers, has resumed his position as director of research of The Master Builders Co., Cleveland, O. Col. Scripture entered the service in 1942 as a captain, and was assigned to the Office of the Chief Engineer, European Theater of Operations. Col. Scripture, also a veteran of World War I, is widely known in the construction industry for his research work in the improvement of concrete and mortars. Outstanding among his developments is cement dispersion, used extensively to increase concrete durability.

•

New Rosco Distributor

Standard Machinery Co., 112 Market St., San Francisco, Calif., has been appointed distributor for Northern California for Rosco Manufacturing Co., Minneapolis, Minn.

A. J. Runnals Joins Culvert Company

Alfred J. Runnals, heretofore road engineer, Vermont State Highway Department, has been appointed consulting engineer for New England Metal Culvert Co., Boston, Mass. This company is associated with Armco Drainage and Metal Products, Inc., Middletown, O. Mr. Runnals joined the staff of the Vermont Department of Highways in 1920 as draftsman and inspector; became assistant engineer in 1923; was office engineer 1925-1930 and promoted to road engineer in 1930-1945.

•

Changes in Ransome Engineering Department

Several changes in the engineering department of Ransome Machinery Co., Dunellen, N. J., were announced recently. John P. Faver was appointed assistant to general manager and consulting engineer. J. E. Bushnell was promoted to chief engineer, George W. Cronk to chief draftsman. Ransome is a subsidiary of the Worthington Pump and Machinery Corporation and is now merchandising its line of equipment through the Worthington Construction Equipment Division.

Service Designed Performance Tested

There's a ruggedness and stability about PERFECTION Bodies and Hoists that definitely stamps them as having a built-in extra stamina that assures long life and a profitable return on your investment.

See the "Perfection" Distributor near you.. write for his name.

THE PERFECTION STEEL BODY CO.
GALION, OHIO

PERFECTION
TRUCK BODIES AND HOISTS

Kauer Heads Institute

T. J. Kauer

T. J. Kauer has assumed his new duties as managing director of the Wire Reinforcement Institute, National Press Building, Washington, D. C. He has also been named secretary and treasurer of the organization. Mr. Kauer comes to his new position from that of assistant managing director of the American Concrete Pipe Association. Mr. Kauer was employed as a highway engineer by the Ohio Department of Highways from 1927 to 1940, at which time he resigned to enter government service. After serving as an airport paving engineer with the Civil Aeronautics Administration in Washington for a short period, he represented the American Concrete Pipe Association in Washington from 1941 until he assumed his new duties with the Wire Reinforcement Institute.

•

J. A. Windram Promoted

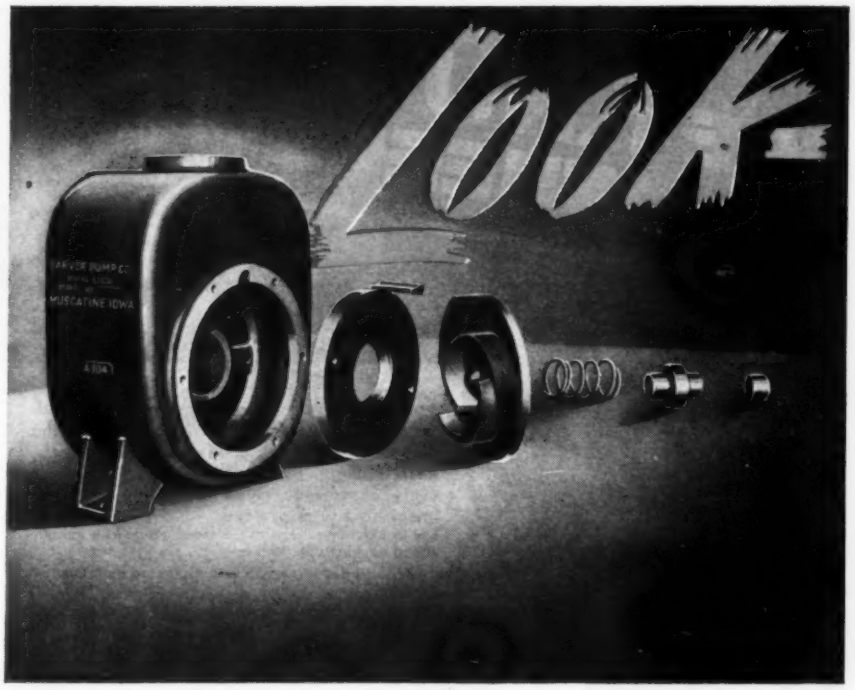
James A. Windram has been appointed manager of the St. Louis district of the Industrial Products Division of the B. F. Goodrich Company. He succeeds George Livermore, district manager for the last three years, who is retiring from the company. Mr. Windram joined the company's industrial products sales division in 1932 and since 1943 had been a sales representative in the St. Louis district.

•

New Richkraft Comptroller

Knute Petersen

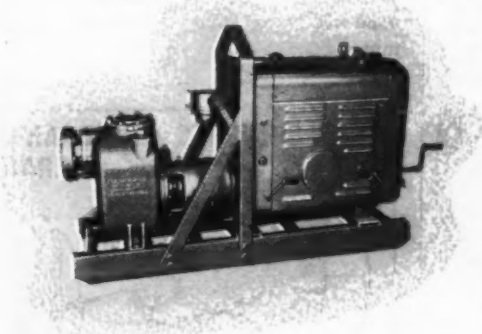
Franklin A Richards, general manager, the Richkraft Co., Chicago, Ill., has announced the appointment of Knute Petersen as comptroller. Mr. Petersen was formerly general production manager and a director of the Bell & Howell Co. until his recent affiliation with The Richkraft Co. He is a graduate of Chicago Teachers College, and did post-graduate work at Northwestern and Chicago Universities. He is a member of the AME and Economic Club of Chicago.



...how simple they are!

There are fewer parts in Carver pumps because every part does its job right. No gadgets have to be added to step up efficiency or correct faults. Impellers are scientifically designed with web-reinforced vanes confining wear to but one side. Renewable liners carry a cast lug protecting the scroll casing at the impeller cut-off where wear is greatest. The wearing surface seal rings of the Carver Lifetime Seal are made of Tungsten Carbide—a material so hard it cuts glass like a diamond.

Every Carver Pump carries a "Certified" tag which means that it has been carefully tested and fully meets our high standards for performance on the job. Write for details or see your local distributor.



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Muscatine, Iowa

CARVER CENTRIFUGAL Certified PUMPS

For more than half a century, we have been Wheel experts. Our experience includes the designing and manufacture of large Wheels, small Wheels, spoke Wheels, disc Wheels—every conceivable type of wheels for every imaginable type of need.
Let us help you meet your Wheel needs with experienced engineering guidance.
Write today for details and Illustrated Bulletins.

EWC WHEELS
Electric Wheel Co., Dept. R5 Quincy, Ill.

New Blaw-Knox Vice President

A. A. Levison

Arthur A. Levison has been appointed vice president of the Blaw-Knox Division in charge of the construction equipment department. He has been associated with the Blaw-Knox Co. since 1923 and is widely known in the highway construction field. During the war, in addition to his other activities, he specialized in supplying various items of Blaw-Knox construction equipment for war department use in building air bases in this country and abroad. Prior to his association with the Blaw-Knox Co., Mr. Levison was employed by the Public Roads Administration as highway engineer on construction and research, and was stationed in Washington, the middle west, and Pennsylvania.

•

Appointed Distributor

R. C. Larkin Co., 3001 S. Wabash Ave., Chicago, Ill., has been appointed exclusive distributors in this territory for International Harvester Co., industrial crawler and wheel tractors; Bucyrus-Erie bulldozers, bullgraders and scrapers; J. D. Adams Co. graders; C. R. John Co. machinery trailers. John H. Hassinger and Herbert B. Cadmus have joined R. C. Larkin Co. as vice presidents.

•

New Sonneborn Chiefs

In a move designed to place its technical production departments on a peacetime footing to meet the problems of reconversion at its plant at Nutley, N. J., L. Sonneborn Sons, Inc.,

Wickwire Spencer Promotes Rollo

Herbert D. Rollo, heretofore wire rope sales manager, for Wickwire Spencer, has been appointed New England district sales manager with offices at 80 Federal St., Boston, Mass. Mr. Rollo has been connected with Wickwire Spencer since 1933.

•

Harvester Buys War Plant

International Harvester Co., Chicago, Ill., has purchased the former Buick aviation engine plant at Melrose Park, Ill., and will use it for expanded production of its industrial power line of products. The greater portion of the plant's 1,200,000 sq. ft. of manufacturing floor space will be used for the production of diesel motors.

Shunk Snow Plow and Ice Removal BLADES

Proved record of superior performance. Made of specially developed steel to withstand severe service conditions.

FOR ALL TYPES AND MODELS OF SNOW PLOWS
Various widths, lengths, thicknesses--flat or curved--standard or special--punched ready to fit your machine.

SHUNK SAW-TOOTH ICE BLADE
Amazingly effective. Thoroughly breaks up and removes heavy, slippery ice and snow formations. Replaces all types of snow plow blades or maintenance units. Write for Bulletin and name of nearest Distributor.

Shunk
MANUFACTURING COMPANY
ESTABLISHED 1854
BUCYRUS, OHIO.

THAW CULVERTS and HYDRANTS with an AEROIL

No. 98 Portable Steam Thawer

A handy steam plant with a detachable thawing torch. Used by leading Highway Departments for Culvert Thawing. Special Culvert Nozzle (10 ft.) available. Send for WINTER CATALOG No. 234-S including Concrete Heaters, Portable Coil Water Heaters, Thawing Torches, Ground Thawers, Salamanders, Tar and Asphalt Heaters, etc.

AEROIL PRODUCTS CO., INC.
5717 PARK AVE. WEST NEW YORK, N. J.
Branches: Chicago, San Francisco, Dallas

LA CROSSE
HEAVY DUTY
MACHINERY TRAILERS
BUILT BY
LA CROSSE TRAILER & EQUIPMENT CO
LA CROSSE, WISCONSIN

has named Irving Silverman to the newly created post of production manager and appointed A. Moscowitz to succeed Mr. Silverman as chief chemist.

•

Egan Promoted by Sheffield

A. B. Egan

Sheffield Steel Corporation, Kansas City, Mo., has announced the appointment of Alfred B. Egan to the position of Manager Sales, Reinforcing Products Division. Mr. Egan has been with Sheffield for sixteen years. For a greater part of this time he was in charge of the Des Moines office. From 1942 until March 1945, he was in charge of Sheffield's Washington, D. C. office. Last March he was appointed District Manager, Chicago District. Sales of Sheffield Steel products for the building and construction field will be under his supervision.

•

Davies Back with Heil

Jack Davies

Back into "civies" after two years as a captain in Army Ordnance, Jack Davies has been appointed district manager for sales of all Heil quality products in Tennessee, Alabama, Georgia, the Carolinas, and Florida. Headquarters for this district are in the Commercial Bank building, Raleigh, N. C. Ray Long, who has been representing the company in this territory, will continue to work out of the Raleigh office but will concentrate on road machinery sales. Davies started in the Service Department of The Heil Co. over 20 years ago, later served as sales representative successively in Wisconsin, Buffalo, Washington, D. C., and Atlanta.

•

New Ransome Distributors

The following distributors are now handling the Blue Brute line of mixers and pavers for Ransome Machinery Co.; Thomas G. Abrams, 710 Meriden Drive, Dearborn, Mich.; Allied Equipment, Inc., 7511 N. W. 7th Ave., Miami, Fla.; Coast Equipment Co., 948 Bryant St., San Francisco 1, Calif.; Lakeshore Machinery & Supply Co., 400 W. Laketon Ave., Muskegon, Mich.

ERIE BUCKETS

• Erie builds all types of buckets in various capacities and weights to meet the job and operating conditions. Choose the correct bucket for the job and you get maximum speed and output. Write for broadside on the complete Erie line of buckets.

THE COMPLETE LINE

3512 GEIST RD.

ERIE STEEL CONSTRUCTION CO.
ERIE, PENNSYLVANIA
Aggre Meters • Buckets • Concrete Plants • Traveling Cranes

SAVE LABOR! CUT COSTS!
With Sauerman Scrapers

Explanation of Picture
Above is a 1/3 cu. yd. Sauerman Scraper hauling gravel out of a wide pit to a crusher that feeds a portable screening plant on a road project.

Crescent Scraper Bucket
Exclusive feature of Sauerman Scraper Machines is the Crescent bottomless bucket which handles large loads faster and with less line-pull than any other scraper.

THOUSANDS of wise engineers and contractors have found that Sauerman Scraper Machines make easy work of many excavating and material handling problems that would be costly by any other method.

Digging, hauling and automatic dumping are merged into a continuous, rapid operation controlled by one operator. Power requirement is moderate. Maintenance is simple.

Sauerman machines offer handling capacities from 10 to 600 cu. yd. per hour and operating spans from 200 to 1500 ft. Specifications of the various sizes and types of machines, together with illustrations of their uses are given in the Sauerman catalogs. Write for this literature today.

SAUERMAN BROS., INC.
588 S. Clinton St. Chicago 7, Illinois

CLEARING HOUSE

TIRE REPAIRS

All sizes truck, tractor up to and including 2400x 32-36 ply tires. Our Equa-Flex repair is built for heavy and rough work.

Farm tractor and passenger tires are guaranteed for the life of the tread.

WALLACE TIRE SERVICE, Inc.
2329 S. Michigan Ave. Chicago 16, Ill.

FOR SALE

Universal ½ yd. full swing crane 35'-0 boom, cab, tagline, hook, Owens bucket, is mounted on Sterling pneumatic truck. George Riemer, 2900 Armitage Avenue, Chicago.

TRANSITS and LEVELS

New or Rebuilt
Sale or Rent

Headquarters for REPAIRS—any make. Factory service. We will also *buy* your old instruments or take them in *trade*.

A complete line of engineering Instruments and Equipment for Field or Office. Write for Bulletin RS-112.

WARREN-KNIGHT CO.
Manufacturers of Sterling Transits and Levels
136 N. 12th St. Philadelphia 7, Penna.

FOR SALE

BROOKS LOAD LUGGERS, late model CH-200, with 2 cu. yd. buckets. First class. Bargain. $650.00.
INGERSOLL-RAND WAGON DRILL 4-2 mounting arranged for 10 ft. changes, with X-71 Drill. Like new, guaranteed. $800.00
315 cu. ft. 2-stage LE ROI PORTABLE COMPRESSOR, rebuilt. Guaranteed. $1875.00.
SCHRAMM, 160 cu. ft.—2-stage, with Buda Gasoline Power Unit. Rebuilt. Perfect condition. $1200.00.
PUMPS, Centr. Self-Priming, various makes, 2" to 6", rebuilt. 55% new price.
MAINTAINER, Adams No. 511, Diesel, with scarifier. 2 years old. Good condition. 55%.
12" x 20" r.b. GOOD ROADS PORTABLE JAW CRUSHER, V-belt drive, 60 H.P. Continental Engine, folding type elevator, gooseneck truck. Overhauled. $3500.00.
KOEHRING 2 cu. yd. Concentric Cone Tilting type Mixer, hydr. air raims, built in 30 H.P. GE. Electric Motor. Like new. $2650.00.

M. WENZEL, 2136 Jefferson, Kansas City, Mo.

FOR SALE

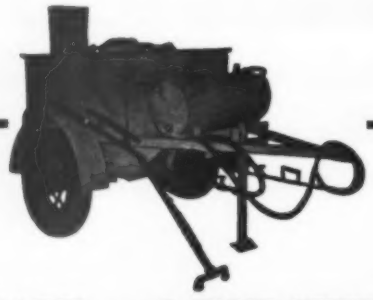
1—Northwest Crane, 45-ft. boom	$5000.00
1—Foot Paver	3000.00
1—Huber Roller, Gas, 10-ton (three wheel)	1350.00
2—Steam Tandem Rollers	(Prices Vary)
1—Barber Asphalt Plant, 2000-lb. box	15,000.00
1—Acm Stone Crusher, screens and elevator, equipped with McCormick-Deering power unit	100.00
2—Euclid, 10 cu. yds., Side Dump Crawler Wagons, each	500.00
1—Barber-Greene Ditcher	2500.00
2—Drott Universal Bull Clam Shovels, each	750.00
1—Buckeye Sub Grader, 10' to 13'.	$250.00

Phil H. McGuire
P. O. Box 34 35th Street Station
Norfolk 8, Va.

FOR SALE

Adams 51 Motor Grader, Single Frame, Tandem Drive, good rubber, International Diesel Motor. First class mechanical condition.

MARTIN TRACTOR COMPANY
Chanute, Kansas



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FIRE PROOF—OIL BURNING
Hand and Motor driven spray.
Many sizes. Write for catalog.

Elkhart White Mfg. Co. Indiana

IN THE HEART OF DOWNTOWN

MILWAUKEE

450 ROOMS of COMFORT

...Friendly hospitality. Coffee Shop, Cocktail lounge, Garage and parking lot. Remember—Milwaukee's BEST BUY!

with bath - from $2.75
without bath-from $1.65

Owner Operated by
The Milwaukee Hotel
Wisconsin Co.
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HOTEL WISCONSIN

Buy More Victory Bonds

VULCAN PAVEMENT AND CLAY DIGGING TOOLS

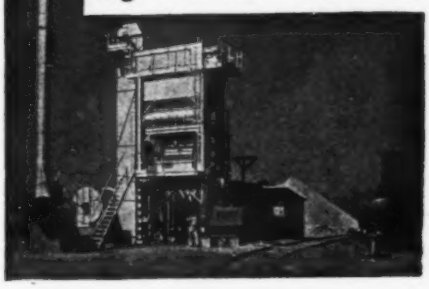
ARE MADE in a complete line of sizes to fit all standard compressed air hammers.

Send for NEW Vulcan illustrated CATALOG today.

VULCAN TOOLS — THE WORLD OVER — NOTED FOR QUALITY AND DURABILITY"

VULCAN TOOL MFG. CO.
QUINCY, MASS.

PORTABLE
ASPHALT PLANTS
High Production—Low Cost



THE McCARTER IRON WORKS, INC.
NORRISTOWN, PENNA.

South Bend
GUTTER-SNIPE
PICK-UP STREET SWEEPERS

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STREET FLUSHERS
STREET SPRINKLERS
BITUMINOUS DISTRIBUTORS
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Since 1908

MUNICIPAL SUPPLY COMPANY - SOUTH BEND 23, INDIANA

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CRUSHING, SCREENING and WASHING UNITS

● Up to 2000 Tons a Day ●

Crushers
Elevators
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Kettles
Conveyors
Drag-Lines
"GAYCO"
Centrifugal
Air Separators

UNIVERSAL ROAD MACHINERY CO.
Kingston, N. Y.

Canadian Representatives: F. H. Hopkins & Co., Ltd.
140 Canada Cement Co., Montreal, Que., Can.

Kelleher Promoted by Hercules

J. J. Kelleher

J. Joseph Kelleher has been appointed manager of the contractors' division, Explosives Department, Hercules Powder Co., Wilmington, Del. He has been a special representative of the department for several years, and is well known among contractors. The division was organized in 1928 by John K. McCabe, now sales manager of the Explosives Department, to assist contractors on large construction projects requiring the use of explosives. Kelleher joined the Hercules Explosives Department in 1929, and has been associated mainly with the contractors' division since then.

•

Valentine Joins Mack

H. P. Valentine

Appointment of Lt. Col. H. P. Valentine as manager of Mack dealer sales and operations has been announced by A. C. Fetzer, vice-president of Mack-International Motor Truck Corp. Col. Valentine comes to the Mack organization after service in the War Department where he was chief of the Transport and Automotive Branch, Production Division Headquarters, Army Service Forces. Prior to his war service, he was with the Chrysler Corp. for 11 years in key executive positions. A graduate of Harvard University, 1926, he began his career in the automotive industry with the Packard Motor Car Co. as an apprentice.

•

New Chain Belt Distributors

Chain Belt Co., Milwaukee, Wis., has announced appointment of Western Contractors Supply Co., 3145 West Lake St., Chicago, as a distributor for its line of Rex pavers, moto-mixers, pumpcretes, and de-watering pumps. William Barrett is head of Western Contractors Supply Co., which was founded 28 years ago by his father, the late Tom Barrett.

SNOW IS COMING

Be ready, with ROSS plows for the first snow fall. They are your insurance against blocked roads and traffic tieups. Ross plows with their "Sno Flo" moldboards will go thru deep drifts and hard packed snow with less power. Those who operate them say "They will come in from a finished job ready to go out on another".

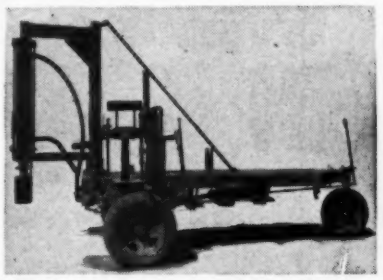
Manufactured by

THE BURCH CORPORATION
Crestline, Ohio

Equipment since 1875

BUY VICTORY BONDS

RAPID!



Cuts concrete and cuts labor costs to 2½c per square yard. Applicable to floor work and different types of inside horizontal work.

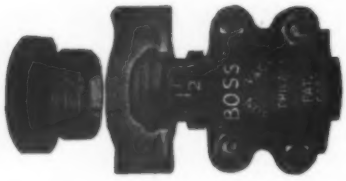
Very efficient in maintenance work of highways.

Boom folds down and readily trailed by any light truck. Make your compressor treble its output by hooking it to this machine.

Rapid Pavement Breaker Co.
1517 Santa Fe Ave.
Los Angeles 21, Calif.

DIXON *Means* HOSE COUPLINGS

That are Reliable and Safe, Always

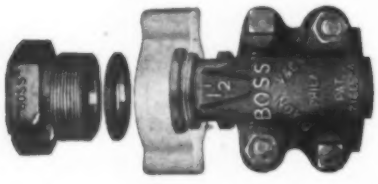


"G J-BOSS"

GROUND JOINT STYLE X-34

FEMALE HOSE COUPLING

Assures maximum efficiency and convenience on high and low pressure steam, air and liquid hose. Washerless, leakproof, safe. Extensively used by contractors and in industrial plants. Sizes: ½" to 4", inclusive, with "Boss" Interlocking Offset Clamp on 1" and larger. ("Boss" Interlocking Clamp on sizes under 1".)



"BOSS"

WASHER TYPE STYLE W-16

FEMALE HOSE COUPLING

Same as "G J-Boss" Female Coupling described above, except that seal between stem and spud is provided by tight-fitting, long-wearing washer. Sizes: 1/4" to 4", inclusive.

NOTE: For companion male thread coupling for both of above, specify "BOSS" Male Coupling, Style MX-16. Sizes: 1/4" to 4", inclusive.

Sold by Manufacturers and Jobbers of Mechanical Rubber Goods.

DIXON
VALVE & COUPLING CO.
Main Office and Factory: PHILADELPHIA, PA.
BRANCHES: CHICAGO, BIRMINGHAM, LOS ANGELES, HOUSTON

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